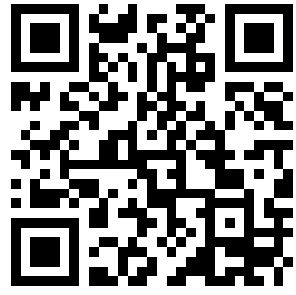

FINAL

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED

GENERAL MOTORS ASSEMBLY PLANT RELOCATION

KANSAS CITY, WYANDOTTE COUNTY, KANSAS

STATEMENT NUMBER: KCK-EIS-1981

Prepared by

City of Kansas City, Kansas

Prepared Pursuant to

Title I of the
Housing and Community Development Act of 1974

April, 1981

This document is a

( ) Draft (X) Final Environmental Impact Statement

The action is

(X) Administrative ( ) Legislative

Proposed

General Motors Assembly Plant Relocation

Kansas City, Wyandotte County, Kansas

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SUMMARY

1.0 SUMMARY

1.1 PURPOSE AND NEED FOR THE ACTION

The City of Kansas City, Kansas, has applied to the U.S. Department of Housing and Urban Development for an Urban Development Action Grant (UDAG) of approximately $13.46 million. The City will use these monies to fund public improvements in the area of the proposed site. HUD's action grant program is used to foster public/private partnerships in the development of industrial, commercial and residential projects which create jobs, expand the tax base or revive declining neighborhoods.

General Motors Corporation has long outgrown its assembly plant in the Fairfax Industrial District of Kansas City, Kansas. The 130-acre site includes a 40-year old, 43-acre assembly facility with 2.1 million square feet of floor area originally used to manufacture bombers during World War II. GM has occupied the plant since 1946 and in that 35 years has expanded and upgraded the facility several times. Although a mezzanine was added to the building in 1962, most expansion efforts have been horizontal in nature. The result has been to complicate the assembly process by requiring a costly and inefficient routing of the assembly line. The operations and equipment at the Fairfax facility are suitable only for manufacturing the traditional chassis/body American car. In the past decade, with rising gas prices, the demand for large American cars has fallen dramatically, and all United States car manufacturers have gradually trimmed their models down and introduced new, more efficient models to better compete with foreign cars.

GM's design for front wheel drive, unified-body cars requires a different manufacturing procedure than the traditional models. In a massive, accelerated capital-investment program, General Motors has been building upgraded assembly plants all over the country to accommodate the significant shift in model design. The new plants are quite similar to each other in design and size. Each one sits on a site of approximately one square mile and each building covers approximately 70 acres.

Kansas City, Kansas, would prefer to keep General Motors as a corporate citizen and major employer. To that end, the City has applied for the UDAG to provide incentives to GM in the form of infrastructure improvements. These improvements were planned for the area anyway. They were scheduled to be built as development accompanying I-435 required them. Western Wyandotte County has grown steadily, and the opening of I-435 (or even a less sophisticated north/south artery) will accelerate and diversify development in the area.

Long-term economic conditions in the County and City make the loss of a major employer relatively serious. The average annual unemployment rate in Wyandotte County for 1980 was 8.4 percent, more than two points higher than the SMSA average. Various income measures indicate that the County is somewhat economically depressed. The local taxing bodies would experience loss of some ad valorem revenues if GM were to leave Wyandotte County. Overall, then, the retention of General Motors in Wyandotte County answers the needs and goals of the City, the County, HUD and General Motors.

1.2 PROJECT DESCRIPTION

The City conducted an industrial site survey to locate a site sufficiently large and suitable for General Motors' new assembly plant design. The chosen site is in the western part of the City bounded by Parallel Parkway, State Avenue, 110th Street, and 118th Street (see Figure I-1). An additional tract just east of 110th Street is planned for a GM-related truck/rail yard. The Kansas City, Kansas Port Authority holds purchase options on these properties. The Port Authority intends to issue Industrial Revenue Bonds (guaranteed by General Motors) to purchase the 530-acre site on the west and an additional approximately 175 acres to the east of 110th Street and construct a manufacturing plant on the site according to General Motors' specifications.

General Motors will be responsible for preparing and leveling the site for construction. The UDAG money would be used for the expansion and improvement of basic public services to the site. Those public improvements include widening and improving streets, construction of new storm and sanitary sewer lines, and construction of a fire station (to be located just east of 110th Street and Parallel). Many of these improvements would be done without the General Motors move. Wyandotte County's long-range capital improvements plan includes the improvements to Parallel Parkway; the additional sanitary sewer lines are part of the Little Turkey Creek Sewer System Plan and a priority item for the Department of Water Pollution Control.

The Port Authority will use its bonding authority under the laws of the State of Kansas to finance construction of the new plant. In order to offer General Motors tax abatement, the Port Authority will retain ownership of the land and improvements and enter into a 20-year lease arrangement with General Motors Corporation. General Motors will, in turn, make payments to the Port Authority to retire the bonded indebtedness and to satisfy an administrative charge. These payments will accelerate over time to retire the debt and replace ad valorem taxes lost with closure of the Fairfax facility. Although the Port Authority is not required by law to distribute the administrative charges to the taxing bodies, it has indicated an intention to do so. These charges will total $53.45 million over the 20 years. The Port Authority has further stated that the periodic increases in General Motors' payments will likewise be distributed to the taxing bodies. These monies will be distributed according to the mill levy rates in effect at the time that an agreement with General Motors is finalized.

Under Kansas law, tax abatement on any project can only be granted for 40 years. General Motors and the Port Authority have agreed to a 20-year lease term with no extension clause. At the end of this time period, General Motors will, through payment of a purchase option, take over ownership of the assembly plant. The property would then go on the Wyandotte County tax rolls, and General Motors would be required to pay ad valorem taxes at the rates then in effect.

1.3 AFFECTED ENVIRONMENT

The proposed site is located in the western portion of Wyandotte County and constitutes the western-most extension of the City of Kansas City, Kansas.

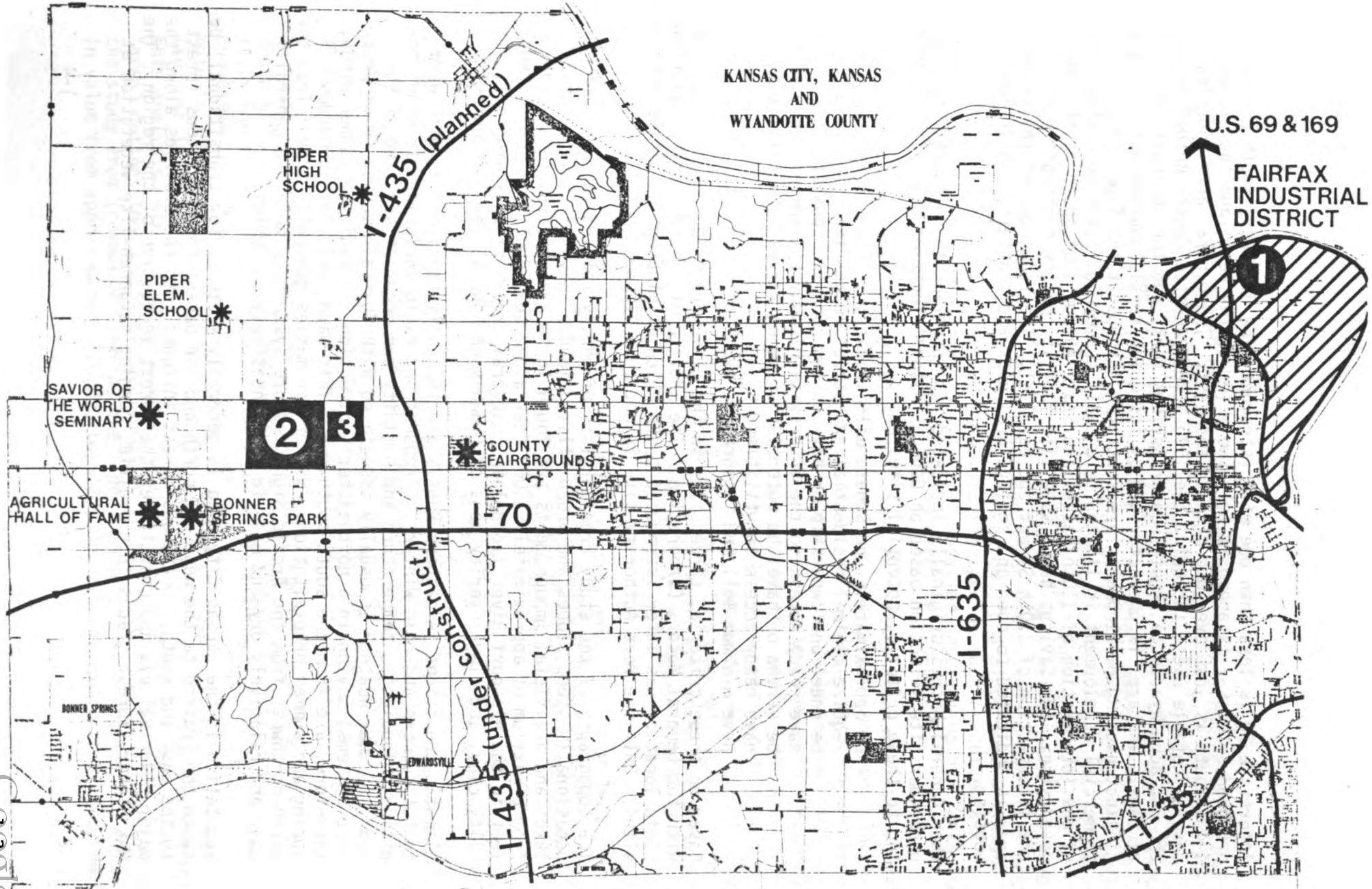

Figure I-1

Site Location Map

Interstate 70 is less than one mile (straight line distance) south of the proposed site; K-7 is approximately two miles to the west; and the proposed I-435 route is just over one mile to the east. The general area contains several notable uses, including the 1500-acre Wyandotte County Bethel Park, the 540-acre Wyandotte County Bonner Springs Park, and the Agricultural Hall of Fame. The area is characterized by its quiet rural/suburban nature. Six distinct housing developments are scattered throughout the Piper area. Commercial development is limited to a small commercial strip on either side of the intersection of 110th Street and State Avenue just south of the proposed site. Sun Savings has a satellite facility on the southeast corner of the intersection of 110th Street and parallel. The remainder of the study area is dedicated to open and agricultural uses and scattered single-family housing.

When General Motors originally indicated its intention to relocate, the City undertook site selection based on General Motors' location criteria. According to these criteria, potential sites must:

be approximately one square mile in size;
require minimal residential and street relocation;
be under one ownership or have as few owners as possible;
have ready access to the interstate highway system;
be served or have the potential of being served by a railroad;
have ready access to utilities;
have minimum soil and topographic problems.

Based on these criteria, three sites in the City were selected and discussed with the General Motors Corporation. The additional criterion of a non-floodplain location was later introduced by GM which eliminated two of the potential sites. Only the Port Authority site is not in a floodplain.

The topography of the study area consists of gently rolling terrain with occasionally steep slopes and broad, flat uplands. Several small natural lakes and artificial impoundments are found in the area. Elevations range from a maximum of approximately 1,060 feet above sea level to a low of 750 feet in the Missouri River floodplain. Several layers of soil--topsoil, silty clay, and clay--overlay beds of brown sandstone at varying depths.

Climatic conditions in eastern Kansas are typically continental, with warm to hot summers and cold winters. Frequent and rapid variations in wind condition, cloudiness, temperature and humidity can occur at any time of the year. Summer weather is usually associated with Gulf air masses (high pressure systems) moving in a northeasterly direction. Prevailing summer winds, therefore, are from the south-southwest. This warm, moist air provides spring and summer precipitation. Winter air masses generally travel from the north-northwest from the Arctic high pressure systems. These are generally cold and relatively dry and move in a southeasterly direction.

Vegetation in the Kansas City area is generally ecotonal (or transitional) between the prairie to the west and north and the oak-hickory deciduous forest to the east and south. Deciduous forest intrudes into the prairies along the major river valleys and constitutes the forest vegetation of the region. The oak-hickory forest grades into prairie, forming savannah-like vegetation at

the transition. The proposed assembly plant site consists primarily of row-crop agricultural fields and three drainageway woods. The truck yard site east of the assembly plant is now agricultural and wooded land. The fields are row-crops, and the woods consist of relatively large trees, most from the oak-hickory association. The area contains considerable forest edge, making this a relatively good habitat, especially for nut-eating wildlife. The general character of areas surrounding this site and specific evidence of off-road vehicle use in the vicinity cast doubt on the site's usefulness for larger wildlife such as deer. For the most part, native plants and animals have either been destroyed or displaced by agricultural development and other activities in the study area. Edge habitat exists along field margins (fence rows) and along some drainageways. This habitat is useful for some wildlife species such as cottontail rabbit, coyote, deer, dove, and squirrel. A detailed description of plants and animal species observed in the study area is given in Appendix A.

The general study area is Federally designated as meeting attainment standards for particulates, sulfur oxides, nitrogen oxides, and carbon monoxide. Therefore, a new GM plant constructed as a result of the proposed action would be subject to EPA review to determine compliance with applicable Federal regulations and requirements. In November, 1980, Kansas enacted temporary emergency regulations for major new sources in designated non-attainment areas (the proposed site is in a non-attainment area for ozone). A key portion of this process is determination of whether Volatile Organic Compounds (VOC) from the proposed plant will comply with the Lowest Achievable Emission Rate (LAER). The Federally imposed construction moratorium in ozone non-attainment areas applied to the general study area will be lifted as soon as the State receives EPA approval for its State Implementation Plan.

The general study area is characterized by existing noise levels of less than L_{dn} 55. This low level is typical of rural and suburban neighborhoods. The majority of L_{10} values are below 70 dBA, the Design Noise Levels set by the U.S. Department of Transportation, Federal Highway Administration.

Surface water resources in the area consist of two major rivers, many small perennial streams and their drainageways, a large man-made lake, and numerous small lakes and ponds, both man-made and natural. Except for information on the two rivers, water quality data are unavailable. The data on both the Missouri and Kansas Rivers show that these waters violate Kansas Department of Health and Environment standards. In addition to surface waters, the area also contains a shallow aquifer characterized as a calcium bicarbonate type of water generally unsuitable for domestic use but adequate for industrial use.

Economic activity in the study area is minimal, limited to some agricultural production and a very small amount of unrelated commercial and business activity. The number of residents in the study area, although small, far exceeds the estimated 200 jobs and indicates that the majority of the residents commute to jobs outside the immediate area. Other than agriculture, the primary land use is residential. Seven distinct residential areas were considered for this analysis; six are recognizable, discrete developments, and the seventh "area" defines the scattered rural housing in the affected region. Housing in the study area (commonly known as the Piper Community) is estimated to range in value from approximately $25,000 to $120,000. The average value is estimated

to be approximately $62,000 to $63,000. Residents of the Piper Area are served by the Piper Unified School District, No. 203, which lies in both incorporated (Kansas City) and unincorporated portions of the western section of Wyandotte County and the Bonner Springs School District. A portion of the study area also lies in Kansas City, Kansas, USD #500. Possible effects on the latter districts were considered minimal and are, therefore, not discussed.

Data from the 1980 census indicate that the study area (1980 Census Tracts 447.01, 448.01 and 448.02) has a current population of 6,915. In 1970, this same area had a total estimated population of 5,004. This represents an increase of 38.2 percent over 10 years. Wyandotte County, in the same decade, lost population. The 1978 County Assessor's Census indicates that over 94 percent of the population is white. Other basic demographic information taken from the 1970 census suggests that the population in western Wyandotte County is middle to upper-middle income and has a high incidence of owner-occupied housing. These indicators are consistent with observations of housing value and the general economic status of residents which is clearly higher than the average for either the nation or the region.

Wyandotte County was the scene of several important events in the history of Kansas and the United States. None of these events, however, took place on or near the project site. Most of the important historic places are found to the east of the proposed General Motors site. According to the State Historic Preservation Officer and the Executive Director of the Wyandotte County Historical Museum, no known archaeological sites have been recorded on or in the vicinity of the proposed General Motors site (see Appendix F).

The quality of life in the vicinity of the proposed site is characteristic of urban-rural fringe areas throughout the Midwest, combining elements of both life styles. Urban elements include residential subdivision development, embryonic commercial development at key intersections, and urban-oriented employment of the residents. Rural elements include large tracts of agricultural land, woodlots, large parcels (10 to 50 acres) with single family residences, and the absence of significant traffic, noise and air pollution. The area is currently undergoing a slow change from rural to urban. Population growth is very rapid, but the area is quite large with six housing developments spread over several square miles. Eventually, the rural ambiance will be lost, and the study area will be transformed into a suburban community with a few rural characteristics. The introduction of I-435 or other highway linkages will have a profound effect on both the rate and type of growth and development.

The Port Authority site west of 110th Street consists of 530 acres with a 1979 assessed value of $59,490 and a property tax bill of $8,789.74. The eastern site is approximately 175 acres and paid $2,591.44 in ad valorem taxes on an assessed value of $16,080.

The Kansas City, Kansas, Board of Public Utilities supplies both water and electricity to the general study area. Electricity is transmitted from the Maywood substation, located approximately 1.5 miles east of the proposed site. The water treatment plant is located at 3601 North 12th Street on the Missouri River and provides service to all of Wyandotte County. Natural gas would be supplied to the site from Union Gas Systems, Inc., of Independence, Kansas.

Service would probably be brought to the plant by a new eight-inch pipeline installed next to an existing eight-inch pipeline which extends along the eastern edge of the proposed site along 110th Street. General Motors currently contracts with Deffenbaugh Industries, Inc., for solid waste disposal. GM solicits bids for these contractual services on an annual basis and, thus, the contractor is subject to change each year. Kansas City, Kansas, Water Pollution Control Department's Waste Water Treatment Plant #20 began operation in the Spring of 1980 and serves the entire study area. The plant is located at 88th Street and Woodend Avenue on the Kansas River.

The proposed site is in the service area of the police station located at 81st Street and Minnesota Avenue. At present, there are plans to add ten police personnel to service the new development. Emergency medical service is available to the general study area at Providence Hospital located at 90th Street and Parallel Parkway. Two fire stations currently serve the general study area. These are located at 1011 North 80th Terrace and 3046 North 81st Street. Current project plans include the construction and equipping of an additional station to be located just east of 110th Street and Parallel Parkway.

The existing network of streets and highways consists primarily of two-lane paved minor arterials. The four roads immediately adjacent to the proposed site will be most significantly impacted by the plant construction. State Avenue, the southern boundary of the site, is the only one classified as a principal arterial. Between 110th and 118th Streets, it consists of four 12-foot lanes, divided, and has separate left-turn lanes at each major intersection. Interstate 70 lies approximately one mile south of State Avenue and, at this point, is also the Kansas Turnpike. It has two 12-foot lanes in each direction, divided, with isolated at-grade intersections. Because of the rural character of the area, current traffic flows are quite low even during rush hour periods.

1.4 ALTERNATIVES CONSIDERED

The no-action alternative, in which the City does nothing to encourage General Motors to remain within the City limits, is not considered viable by General Motors Corporation, the City of Kansas City, or the United States Department of Housing and Urban Development. Economically, such a decision would have an adverse impact on both General Motors and the City. General Motors would be forced to either continue operating the Fairfax plant or seek a suitable location outside Wyandotte County. General Motors is not likely to continue to operate the outdated and inefficient Fairfax facility, which provides them no alternative other than relocation. The City, then, would lose a major industrial taxpayer and employer, the rate of unemployment would increase, social welfare costs would rise, and the decrease of local wage earners would negatively impact the aggregate purchasing power of City residents.

Regardless of any action by General Motors, the Piper Area will grow and develop. The seeds of suburbanization have already been sown, and with no action whatsoever, the study area could be expected to evolve into a typical suburban community. Construction of I-435, however, with or without General Motors, will have a significant impact on the growth rates in the Piper Area. The conditions created by no action are considered to be those that could reasonably be expected to occur as a result of current development patterns influenced by the

construction of I-435. In January, 1973, in response to the proposed interstate, the City produced a comprehensive plan for the western portion of the incorporated area. The comprehensive plan was updated in January, 1981, and is still preliminary. (See Appendix D.) However, the land uses foreseen in that earlier plan are assumed herein to be the logical result of no action by the City or General Motors.

The 1973 comprehensive plan indicated that the interstate corridor itself would be absorbed by light industrial, commercial and multi-family housing. This corridor is limited to no more than one-half mile to either side of the interstate. The remainder of the Piper Area, that is, that portion within City limits, was to be developed in low-density, single-family dwellings; scattered multi-family housing; and commercial centers at major intersections with some strip development along major thoroughfares. Significant portions of the area were also dedicated to open space.

Because of the adverse effects on General Motors operations and the City's economic and tax base, for purposes of this Environmental Impact Statement, the no-action alternative is rejected.

The entire American car industry has undergone considerable change in the past five to 10 years. Some of these changes have been mandated by Federal regulations; others have been in response to market conditions. Durable goods manufacturers, by their very nature, cannot respond quickly to changes as extreme as these. The result has been an industry-wide deterioration of profits and financial stability in general. General Motors has recently experienced its worst financial showing in the last 50 years of operation. General Motors' answer has been a nationwide construction program under which they have designed and built a number of new assembly facilities. These plants incorporate a flexible and efficient production line and state of the art technology. Old facilities such as Fairfax are being systematically replaced nationwide by these newer, more cost-effective facilities. Postponement would not result in a reconsideration of the need for relocation but would place General Motors in an increasingly poor financial position and result in the same set of circumstances as the no-action alternative. Consequently, postponement of the action is not a viable alternative.

Two major considerations render the existing facility unsuitable for renovation and expansion by General Motors. The physical plant's limited size, age and obsolescence would require that the building undergo a major and costly overhaul. Such a capital investment, from General Motors' viewpoint, would not be a cost-effective solution. Furthermore, the entire Fairfax Industrial District is located within the 100-year floodplain of the Missouri River. Even though the (Fairfax) area is protected by a levee, the Corporation chooses to avoid major capital expenditures in flood-prone areas as a prudent investment strategy. GM attempts in all of its projects to minimize the occurrence of flooding, to reduce initial construction costs, to avoid risks of flood damage to costly buildings, equipment and machinery, and to avoid the necessity of production shut-downs while repairs to flood-damaged facilities are performed. Consequently, expansion or renovation are not viable alternatives.

There are no buildings, vacant or occupied, in Kansas City, Kansas, which meet the structural, operational and spatial needs or could be adapted to meet those needs of General Motors.

Although relocation of General Motors Assembly Plant outside the limits of Kansas City, Kansas, is a viable alternative for the Corporation, it is not for the City. As detailed above, such an action would be to the social and economic detriment of the City as a public body and to residents as individuals. Consequently, this alternative is not considered viable.

The alternative of relocation within Kansas City, Kansas, allows continuation and improvement of the long and mutually beneficial relationship between General Motors Corporation and the City of Kansas City, Kansas. Consequently, this alternative is recommended as the only viable choice.

1.5 ENVIRONMENTAL CONSEQUENCES

The proposed site is a gently rolling upland surface that would be impacted directly by extensive earthmoving and construction activities. As a result, previously unaltered topography and soils would be disturbed and replaced by an automobile assembly plant complex.

No significant impacts on climatological or meteorological systems would occur.

Impacts on vegetation and wildlife are slight as the area has long been used for agricultural production. Implementation will result in loss of tilled and pastured lands and approximately 80 acres of oak-hickory woods and associated habitat. This loss will be mitigated through vegetative plantings on the proposed site itself and along the rail spur right-of-way in accordance with policies of pertinent State and Federal agencies.

The proposed site would not be exposed to greater natural hazards than any other location in the region nor would it increase the likelihood of any natural hazard occurring.

Implementation of the proposed action will result in full compliance with all applicable air quality regulations and standards. Ambient air quality standards are not expected to be exceeded, nor is significant deterioration of ambient air quality levels expected.

Noise levels due to proposed plant activities will be less than 60 L_{dn} at the General Motors property line. However, residents in the study area at present enjoy a noise level of approximately 50 L_{dn}, so the environment will be perceived as twice as loud as that existing at this time. Peak hour traffic noise forms the major noise impact of the proposed action. Houses on principal arteries will experience sound levels above L_{10} 70, which is considered by the Federal Highway Administration to be the upper limit of acceptable noise.

Water quality in the general study area may be impacted both by stormwater runoff from the site and by sewage flow from the plant itself. However, stormwater impacts will be minimized by a complete system of on-site management facilities which will remove most pollutants from the runoff before discharging it at a controlled rate of flow into natural drainageways. Sewage generated by the plant would be of two types--process and domestic. Process wastewater would be pre-treated to meet Kansas City, Kansas, Water Pollution Control Department standards and then be released, along with domestic wastewater, into the municipal sanitary sewer system to receive secondary treatment.

Implementation of the proposed action would introduce industrial uses and zoning into a large area of land currently used and primarily zoned for agriculture and housing. This conversion of agricultural land to urban uses is already in progress and will be accelerated by construction of I-435. However, with relocation of the General Motors plant, the pace of this transition will be faster and the overall intensity of use higher.

Impacts on existing areas in open space, recreation and institutional uses would not be significant as these facilities are at some distance north and west from the site.

Housing impacts will result to a considerable degree on the rail line rather than the plant itself. The proposed rail route will affect expansion of two residential areas - old Piper and the Countryview Subdivision. This route runs close to the boundaries of both housing areas and would, to some degree, limit their future expansion. Furthermore, existing housing may not appreciate in value as rapidly as might be expected without the rail line, but this would be a short-term impact lasting less than five years. Only Delaware Acres, just south of the Port Authority site, would be directly impacted by the plant itself. Whereas it is now single-family residential with large lots, the remainder of the section may develop as medium-density multiple family housing and may conceivably include prefabricated and mobile home development. Although mobile home or modular housing development frequently occurs near major industrial sites, the demand here may not be great because the new plant would not be located a significant distance from the old, and employees are not expected to relocate their residences as a result of the plant move. The primary impact would be from commercial development along State Avenue and increased traffic leads at shift changes.

Population increases for the ten-year period from 1980 to 1990 were estimated. The 1990 population for the area is projected to be 9,675, an increase of 39.9 percent over 1980 census counts.

Piper USD #203 1990 enrollments were estimated based on anticipated population growth. Enrollment in the Piper system is projected to increase by 63.6 percent over the ten-year period to 1,392. This rate is only slightly higher than the increase from 1970 to 1980 and considers the positive effect of population growth, especially among child-bearing age groups, as well as the negative effects of declining birth rates.

With the proposed action, the entire western portion of the County will develop at a faster rate and somewhat differently than it has in the past or could be expected to in the future even with construction of I-435. However, until the City's updated land use plan is adopted, no accurate estimate of the level of commercial activity can be made. Consistent with land use patterns for suburban areas, commercial centers are expected to appear at major intersections with some strip development appearing along State Avenue and possibly Parallel Parkway. The City can, through adoption of the updated land use plan and effective exercise of zoning regulations, control these factors to a considerable degree.

Employment and income impacts will be significant. Short run impacts from the construction phase (1981 to 1983) will include 625 direct jobs on the average and a peak of 2,000 (see Table VI-15). These numbers represent average number of jobs, not total employment, which are entirely different measures. The total number of people actually employed during the two-year construction phase will be much higher than 625 because many specialized crafts will be required for only a short period of time. Thus, the 625 represents the average expected employment for any given point in time during the two years. Multiplier effects are a function of the number of jobs filled at any given time, so the multipliers are applied to these average figures. The multiplier effects produce an additional, secondary impact of 653 to 1,044 jobs. The total increase in SMSA employment, then, is estimated to be 1,278 to 3,044. Construction workers currently earn an average hourly wage of $15.25 (including paid benefits) and work an average of 1,800 hours every year. This translates into direct construction wages for the proposed project of $17.2 to $54.9 million per year and secondary impacts of $21.6 to $34.5 million per year. Total income impacts for each of the two years of construction would range from $38.7 to $89.9 million. These impacts, both employment and income, will accrue to the entire SMSA. Impacts specific to Wyandotte County or the City cannot be estimated without employment by place of residence data, and that information will not be available until an actual construction crew is hired.

The long-range impacts created by General Motors operations will come only from that additional employment at the Port Authority site which is over and above employment at Fairfax. Three employment levels from 1980 were chosen to determine a range of impacts (see Table VI-16). These impacts are specific to Wyandotte County, as General Motors was able to provide residential zip code data on its employees. Based on these data at various production levels, the new plant will employ from 176 to 853 Wyandotte County residents in addition to those already employed at Fairfax. Secondary employment impacts are estimated to be 337 to 1,633 for a total increase in employment of Wyandotte County residents of 513 to 2,486, depending on production levels. The income earned by the new Wyandotte County General Motors employees is estimated to total $5.4 to $26.2 million and produce secondary, multiplicative effects in the County economy of $11.7 to $56.9 million. This translates into a total positive income impact on Wyandotte County of $17.1 to $83.1 million. All multipliers used in this Environmental Impact Statement are final multipliers which means they trace the effects of each employee and each dollar of income throughout the entire regional economy. The values given as multiplier effects are cumulative and represent the sum of the impacts on all sectors of the economy. Detailed analyses of the economic and fiscal impacts of the proposed plant were prepared by the City and are included in Appendix E.

The Kansas State Historic Preservation Officer has confirmed that no National Register historic sites are in proximity to the proposed plant location, and that no archaeological sites have been recorded in the general study area (see Appendix F).

"Quality of life" is a subjective term that assumes *a priori* that some life styles are "better" than others and that ambient factors of air quality, noise and general surroundings affect that "quality". In this case, the quality of life in the study area will be impacted by being changed from rural/suburban

to a higher density of uses including residential, industrial and commercial, at a rate faster than would be expected without the project.

All of the proposed plant's utility requirements--electricity, natural gas, solid waste, water supply, sanitary sewerage, and telephone--would be easily served from nearby existing facilities. In addition, all of these utility systems currently have sufficient excess capacity to serve the plant.

Routine security, fire and health requirements would be handled by General Motors' own on-site personnel and facilities. Emergency police and ambulance needs would be adequately met from existing facilities in the area. If the proposed plant is approved, a new fire station would be built just east of 110th Street on Parallel Parkway to increase the emergency fire response capability in the study area, and the police department will increase personnel in the area by ten officers.

Traffic volumes would increase in the vicinity of the proposed site as a consequence of the project; these vehicles would consist largely of private automobiles with trucks comprising approximately 10 percent of the total traffic. These traffic impacts are manageable considering existing roads and planned improvements and will not result in significant deterioration of the road network.

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PURPOSE AND NEED FOR THE ACTION

3.0 PURPOSE AND NEED FOR THE ACTION

3.1 PURPOSE OF ACTION

3.1.1 Agency(s) Involved

The City of Kansas City, Kansas, has applied to the United States Department of Housing and Urban Development for a $13,460,000.00 Urban Development Action Grant (UDAG). The City intends to use these monies to help fund public improvements in the area of the proposed site for the new General Motors plant. Those public improvements include widening and improving streets, construction of new storm and sanitary sewer lines, and construction of a fire station (to be located just east of 110th Street and Parallel Parkway). Many of these improvements would be done without the General Motors move. Wyandotte County's long-range capital improvements plan includes the improvements to Parallel Parkway; the additional sanitary sewer lines are part of the Little Turkey Creek Sewer System Plan and a priority item for the Department of Water Pollution Control; the fire station is assumed by the City to be required as development around I-435 and beyond occurs.

3.1.2 Program Objectives

The Urban Development Action Grant Program is used to foster public/private partnerships in the development of industrial, commercial and residential projects which create jobs, expand the tax base or revive declining neighborhoods. UDAG's help communities respond to current, often one-time, investment opportunities in which private investment is also stimulated. The funds are used most often for public facilities but can be applied to any activity from the construction of those facilities to loans to assist public-private development projects.

3.2 OBJECTIVES OF THE ACTION

The public monies targeted for western Kansas City, Kansas, will satisfy several short and long range objectives. Although the area economy has grown very slowly, the growth that can be expected to occur in the next five to ten years will demand the expansion and improvement of basic public services. The completion of Interstate 435, scheduled for 1983, will create an even greater demand for public services regardless of any action General Motors might take. The transportation network, as it currently exists, is now in need of expansion and surface improvements, and these needs will increase in importance as I-435 nears completion. The same reasoning applies to the need for a fire station in the area.

Western Kansas City, Kansas, has virtually no commercial activity. Interstate 435 is expected to accelerate development, and the City would like to provide for that eventuality by expanding the storm and sanitary sewer systems. These facilities would serve not only the existing community, but provide the necessary infrastructure for future residential, commercial and industrial growth.

Finally, the City would like to encourage General Motors to remain in the area, preferably in Kansas City, Kansas. To that end, certain basic improvements must be made at the proposed site. These include providing access to the four

bordering streets, facilitating traffic flow and insuring sufficient sewer line capacity. If the proposed site were to be developed into a mix of uses other than industrial, these improvements or some combination thereof would be needed anyway.

3.3 HISTORY AND BACKGROUND OF THE NEED

3.3.1 Area Profile

The Kansas City, Missouri-Kansas, SMSA is a seven-county metropolitan area that lines at the confluence of the Kansas and Missouri Rivers in the center of the 48 contiguous states. Because of its central location, Kansas City has become a major transportation center for air, rail, barge and highway transport.

The original settlements served as supply centers for expeditions going west. As civilization moved across the continent, Kansas became the "bread basket of the nation" and one of the world's richest agricultural areas. Kansas City became an important international center of agribusiness.

Today, Kansas City is a major center of trade and commerce. The 1978 SMSA population was estimated by the Bureau of the Census to be 1,223,700 with a 1977 per capita income of $7,883, more than 12 percent higher than the national responding to perturbations in the national economy but exhibiting less severity. Unemployment rates exhibit patterns similar to the national rates, but the levels are usually lower.

Wyandotte County is an essential economic part of the Kansas City SMSA. For 1978, the Bureau of Economic Analysis of the United States Department of Commerce, reported that Wyandotte County provided employment for over 90,000 SMSA residents. Much of that employment is in industry, although the economic base is fairly diversified. The 1980 census counts indicate that Kansas City, Kansas, population is now about 159,000, making it the second largest city in the SMSA. In terms of jobs, Wyandotte County is second in the SMSA only to Jackson County in Missouri.

Transportation facilities and access are excellent. The Kansas Turnpike and I-70 link the City to Denver, St. Louis and Wichita. Interstate 635 is the SMSA's inner loop and ties Wyandotte County to Johnson County and I-35 on the south and to Kansas City International Airport, I-29 and I-35 on the north. The completion of I-435 will close the outer loop and makes the western portion of the County more accessible to the mainstream of the SMSA economy.

3.3.2 Current and Projected Need

General Motors Corporation has two large assembly facilities in the Kansas City SMSA. At full production levels, they make General Motors one of the largest employers in the metropolitan area. Greater Kansas City has a diversified economic base and healthy local economy, but no metropolitan area chooses to lose a major employer. Kansas City, Kansas, with the reduction of activity in the stockyards several years ago, suffered major employment losses. These losses were based primarily on general economic conditions, not problems with the City itself. Now Kansas City, Kansas, is faced with the prospect of losing yet another major employer due to the national economic climate and extreme

market pressures in the automobile industry. By supplying General Motors with a suitable site in a reasonable amount of time, Kansas City hopes to prevent another move out of the City and perhaps even the region.

Manufacturing has been an extremely important economic activity in Wyandotte County, providing substantial portions of the County's and SMSA's jobs and income. According to 1977 data from the Bureau of Economic Analysis, nationwide durable goods manufacturing accounted for 13.1 percent of all wage and salary employment and 16.8 percent of all personal income. In the Kansas City SMSA, durable goods manufacturing accounted for 11.4 percent of wage and salary employment and 15.2 percent of all income. In Wyandotte County, however, the level of durable goods manufacturing employment was substantially higher than either the SMSA or the nation at 16.6 percent. Income from that industry was 23.6 percent of all Wyandotte County personal income by place of work.

TABLE III-1

DURABLE GOODS MANUFACTURING AS A
PERCENT OF TOTAL EMPLOYMENT AND INCOME, 1977

	Employment	Income
Nation	13.1%	16.8%
SMSA	11.4%	15.2%
Wyandotte County	16.6%	23.6%

At full production, General Motors employs about 5,300 personnel at the Fairfax plant and, at the current level of one production shift, about 2,400. At various times in 1977, depending on production levels, General Motors alone would represent 17.1 to 37.7 percent of all manufacturing employment in Wyandotte County and 2.7 to 6.0 percent of all wage and salary employment. Average annual unemployment in Wyandotte County in 1980 was 8.4 percent (the SMSA average was 6.3); the loss of General Motors would increase the county rate significantly.[1]

General Motors' Fairfax facility currently pays $.8 million in ad valorem taxes per year to the City of Kansas City.[2] The City collected more than $20.3 million total ad valorem taxes in 1979 which constituted nearly one-third of City income. The City's share of General Motors taxes amount to 3.8 percent of ad valorem tax revenues and 1.2 percent of all City revenues. If General Motors were to move out of the City, these direct fiscal losses would have to be recouped somehow, probably through tax increases. Other, secondary losses will be discussed later.

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[1]The actual increase depends on the production levels used, but the maximum would be between one and two percentage points.

[2]An additional sum of more than $1.1 million in ad valorem taxes is paid to all other local taxing bodies.

3.3.3 Purpose and Need for the Action

General Motors Corporation long ago outgrew its assembly plant in the Fairfax Industrial District. The 130-acre site includes a 40-year old, 43-acre assembly facility originally used to manufacture bombers during World War II. General Motors has occupied the plant since 1946 and in that 35 years has expanded and upgraded the facility several times. Expansions have been both vertical and lateral, and the result has been to complicate the assembly process by requiring costly and inefficient routing of the assembly line. Conveyors move partially assembled cars and parts great distances from one production point to the next with little, if any, useful function occurring in the process. The necessity of operating the plant in this manner costs time which, in turn, translates into lost dollars.

Another reason for vacating the Fairfax plant involves the physical characteristics of the area. The Fairfax Industrial District is roughly triangular. The Missouri River marks the state line and forms natural boundaries on the north and east, and a substantial bluff marks the edge of the Kansas City, Kansas, urban core on the southwest. The entire district sits in the flood plain, which is protected from flooding by substantial levees. However, it is the current policy of General Motors' to avoid major capital expenditures in flood-prone areas. General Motors attempts in all of its projects to minimize the occurrence of flooding; to reduce initial construction costs; to avoid risks of flood damage to costly buildings, equipment and machinery; and to avoid the necessity of production shutdowns while repairs to flood-damaged facilities are performed.

The primary reason for replacing the Fairfax facility is a much more universal economic reality that has deeply affected the entire United States automobile industry. In the past decade, with rising gas prices, the demand for large American cars has fallen dramatically, and all United States car manufacturers have gradually trimmed their models down and introduced new, more efficient models to better compete with foreign cars. General Motors' design for front wheel drive, unified body cars requires a different manufacturing procedure than the traditional models. Altering the Fairfax plant to produce the smaller models would involve significant further investment in an already inefficient and cramped manufacturing facility. In a massive, accelerated capital-investment program, General Motors has been building upgraded assembly plants all over the country to accommodate the significant shift in model design. The new plants are quite similar to each other in design and size. Each one sits on a site of approximately one square mile and each building covers approximately 70-acres.

The needs of General Motors, then, are best met through construction of a new facility designed to produce unified body, front wheel drive cars. The new plant design also incorporates state-of-the-art technology which facilitates rapid design change-over without extensive capital outlays. The versatility of the new plant design is such that different automobile models can be manufactured at this facility with a minimum disruption of production.

Perhaps the most significant criterion in industrial location decisions is the quality of labor force. A reliable productive labor force with relative freedom from labor relations problems is the goal of every plant manager.

Without such employees, the most sophisticated technology in the world is virtually useless. In Kansas City, Kansas, General Motors has enjoyed just such a work force for many years. That and General Motors' exceptionally good relationship with the City government were primary factors in General Motors' stated preference to at least remain in the greater Kansas City Area.

For the City's part, the loss of a major employer, while not catastrophic, would have both short-term and long-term negative economic impacts. These effects have been considered in some detail by the City and are included in this document as Appendix E.

ALTERNATIVES

4.0 ALTERNATIVES CONSIDERED

4.1 NO ACTION

The no-action alternative is not considered viable by the General Motors Corporation, the City of Kansas City, or the United States Department of Housing and Urban Development. Failure to take action would force General Motors to choose one of two disadvantageous courses of action.

The first choice, to remain in the existing plant in the Fairfax Industrial District, would cause General Motors to continue operations in an old, obsolete and deteriorating facility and incur almost continuous expenditures of capital to keep it in an acceptable state of repair. A second deleterious impact this decision would have on General Motors is preclusion of manufacturing, at the existing plant, the new type of unified body "X" car now so in public demand. This choice would deny General Motors future options of determining which of several body types to assemble at the plant and would make the corporation highly susceptible and vulnerable to the vagaries of market demand.

The second choice open to General Motors under the no-action alternative would adversely impact the City economically, as General Motors would relocate outside of the Kansas City SMSA. The Port Authority site could then be expected to develop according to the City's 1973 Comprehensive Plan for the I-435 corridor. This plan was developed in response to the needs of newly annexed areas as well as construction of Interstate 435 and describes the amount and type of development expected to accompany those actions. Further, a land use plan implicitly outlines in what way a public body intends to control development. Presumably, under the no-action assumption, the Fairfax plant would continue to operate but, as something other than an automobile assembly facility.

The 1973 Comprehensive Land Use Plan (see Figure IV-I) indicates that the Port Authority site was originally planned for single-family residential, open space agricultural and commercial development. The no-action alternative is presumed to result in development consistent with this Plan. Such development could be expected to begin in earnest when I-435 opens in 1983 or when additional access to I-70 is provided near the proposed right-of-way for I-435.

Exactly how long the development of western Wyandotte County would take is subject to a number of uncertainties, including demand for various land uses at that time. But in any case, saturation would probably occur within 20 years of I-435's opening. Approximately 200 acres of the site would be used for low-density, single-family housing, 6.5 acres were planned for commercial development, and the remainder of the site is shown in open space/agriculture. If single-family homes with a current dollar value of $85,000 are built at the rate of 20 per year and reassessment occurs in the next two-three years as predicted by the County Assessor, at the end of ten years, these 200 houses will have a total assessed value of $5.1 million and will pay (at 1979 mill levies) about $.7 million in ad valorem property taxes.

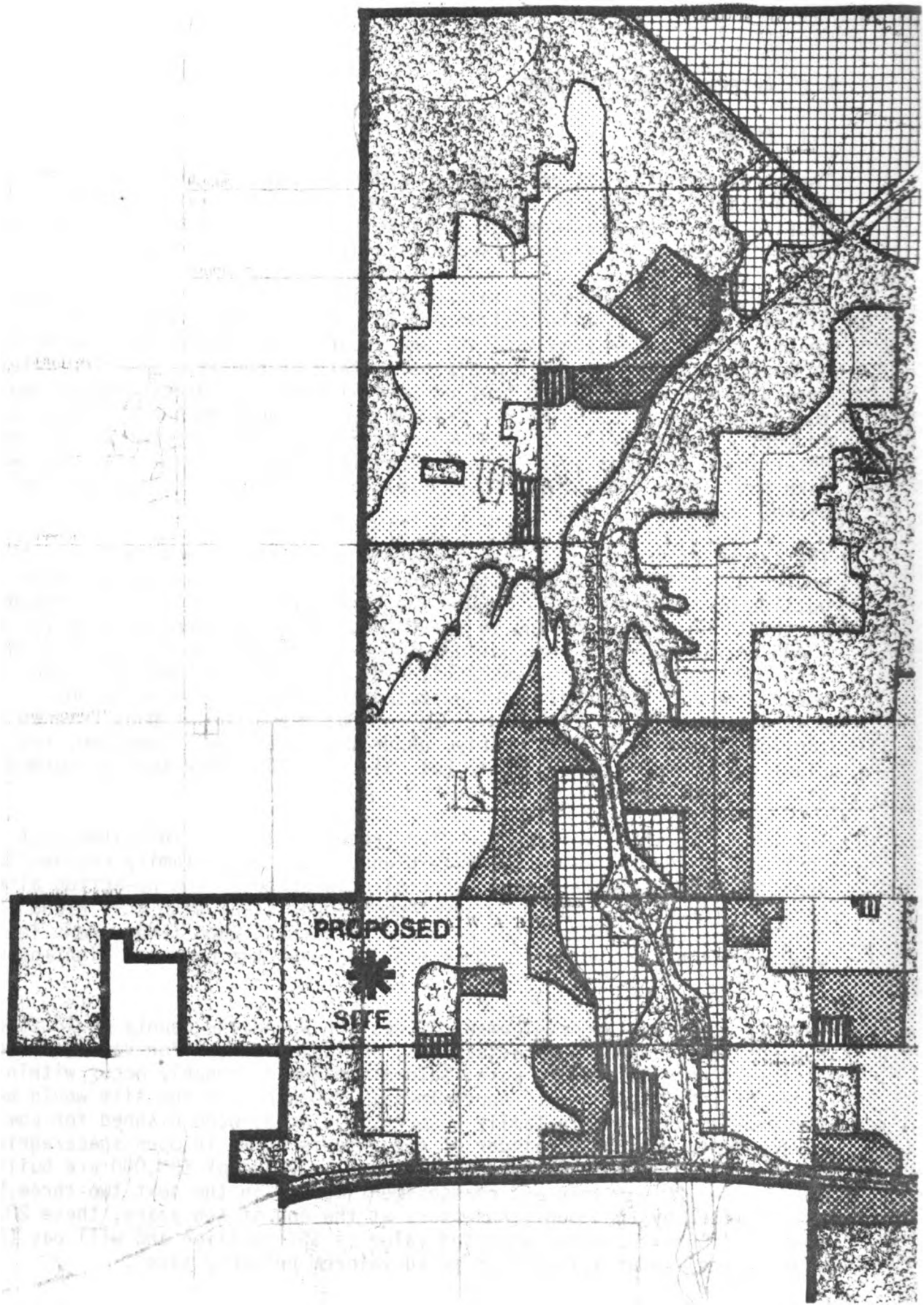


FIGURE IV-1

PROPOSED LAND USE (KANSAS CITY, KS., 1973)

- Single Family Housing
- Multi-Family Housing
- Open Space
- Commercial
- Industrial

4-2

0 2000 4000 6000 8000 10000ft

In order for the Port Authority site to match the $1.7 million General Motors currently pays every year in ad valorem taxes, commercial development would also need to occur. This would, according to the Comprehensive Plan, occupy 6.5 acres in the southeast corner of the site at the intersection of 110th Street and State Avenue. Land and improvements would need a 1980 market value of $25 million to produce approximately $1.0 million in ad valorem taxes. By current market values for commercial property, these are reasonable figures. However, it would take ten years for the residential and commercial development to equal General Motors current tax bill.

Further, these estimates are 1980 dollars and do not account for inflation. By 1990, the $1.7 million paid by home and shop owners would be worth far less in terms of buying power than the $1.7 million General Motors pays now. This analysis does not consider ad valorem taxes that would be paid by the next tenant of the Fairfax plant as those would be contingent upon capital improvements and equipment which would depend on many factors.

Employment losses to Wyandotte County and the City would occur as soon as General Motors closed its Fairfax plant and moved elsewhere. Table IV-1 shows three levels of employment at that plant and the number of those employees that live in Wyandotte County. Secondary employment losses would also accrue over time. The multiplier used here is an industry-specific, SMSA multiplier for motor vehicle and equipment assembly. The resulting employment loss is distributed by the place of residence of General Motors employees to estimate the impacts on Wyandotte County only.

TABLE IV-1

ESTIMATED EMPLOYMENT IMPACTS OF THE NO-ACTION ALTERNATIVE

	3/80-Avg. GM Employment	2/80-Peak GM Employment	11/80-Current GM Employment
Fairfax Employment	4,700	5,300	2,600
Proportion of General Motors Employment Living in Wyandotte County (25.092 percent)	1,180	1,330	653
Multiplier Effect (2.914401)	3,439	3,876	1,903

SOURCE: General Motors Corporation; Kansas City, Missouri, City Development Department; PGAV/Community Resource Corporation

December, 1980.

City and County residents lost as employees, would also, at least in the short run, no longer receive any income from General Motors. An average annual salary for Fairfax employees was calculated and the income multiplier applied to estimate the loss not only in income, but in retail sales and sales taxes. These estimates do not account for any employment benefits paid by either the State, the United Auto Workers, or General Motors. Table IV-2 presents the results of these calculations.

TABLE IV-2

ESTIMATED INCOME IMPACTS OF THE NO-ACTION ALTERNATIVE

	3/80 Average	2/80 Peak	11/80 Current
Fairfax Employment (Wyandotte County residents)	1,180	1,330	653
Average Annual Income[1]	$ 30,708	$ 30,708	$ 30,708
Total GM Payroll to Wyandotte County residents	$ 36,235,440	$ 40,841,640	$ 20,052,324
Multiplier Effect (2.17280808)	$ 78,732,657	$ 88,741,045	$ 43,569,852
Total Personal Income Lost to Wyandotte County	$114,968,097	$129,582,685	$ 63,622,176
Estimated Disposable Income[2]	$ 54,484,048	$ 64,791,343	$ 31,811,088
Estimated Sales Tax Lost (1 % City Tax)	$ 574,840	$ 647,913	$ 318,111

[1]Average wage information was supplied by General Motors and is based on an average production worker's hourly cash wage of $10.68, plus $6.38, per hour in paid benefits and an average annual number of hours of 1,800.

[2]Disposable income is defined here as an estimate of total consumption. The gross annual income was reduced by 50 percent to account for taxes and purchases (such as mortgage payments) which are not subject to sales tax.

SOURCE: General Motors Corporation; Kansas City, Missouri, City Development Department; PGAV/Community Resource Corporation

December, 1980.

Economic benefits accrued to Kansas City, Kansas, as a result of development of the proposed site in accordance with the 1973 Comprehensive Land Use Plan for Interstate 435 would not be sufficient nor rapid enough to offset employment and income losses. The negative impacts attributable to General Motors relocating outside the area would include both primary and secondary losses of employment opportunities, income and the taxes generated by them and General Motors directly. Consequently, for purposes of this Environmental Impact Statement, the no-action alternative is rejected as non-viable.

4.2 POSTPONEMENT OF THE ACTION FOR FURTHER STUDY

The General Motors Corporation has recently sustained its worst financial showing in the last 50 years of operation. A significant contribution to this financial difficulty was the Corporation's inability to produce sufficient numbers of the new, small-bodied, fuel-efficient "X" cars so in demand. The Corporation was hindered from producing these cars in large measure because many of its assembly plants are small, old, obsolete operations that cannot be adapted to manufacture anything except the large-body type of car. This handicap is readily apparent in the existing Fairfax plant which is multi-storied, old, and much too small to be efficient. Postponement will not result in new relocation conclusions, but rather, would place General Motors on an increasingly poor financial footing. This would undoubtedly force General Motors to relocate, which would result in the same impacts as the no-action alternative.

Consequently, postponement of the action is not a viable alternative.

4.3 RENOVATION/EXPANSION OF THE EXISTING FACILITY

In addition to the existing assembly plant's age, ever-increasing obsolescence, and size limitations, another even more important factor weighs against its renovation and/or expansion: the plant is located in the 100-year flood plain of the Missouri River. The risk of flooding and possible disruption of plant operations have resulted in General Motors' adoption of a policy that all future plants will be outside areas prone to flood hazard.

Consequently, expansion is not a viable alternative.

4.4 ACQUISITION AND RENOVATION OF AN EXISTING INDUSTRIAL FACILITY

There are no buildings, vacant or in use, in Kansas City, Kansas, which meet the Corporation's structural and operational requirements or could be adapted to meet these needs. Consequently, this alternate is not an acceptable choice.

4.5 RELOCATION OUTSIDE OF KANSAS CITY, KANSAS

Although relocation of the General Motors Assembly Plant outside the limits of Kansas City, Kansas, may be a viable alternative for the Corporation, it is not for the City. As detailed above, such an action would be to the social and economic detriment of the City as a public body and to residents as indivduals. The City and County would lose millions of dollars in direct taxes and paychecks spent locally by General Motors employees. In addition, General Motors has announced publicly that it wishes to remain within existing City boundaries.

Consequently, this alternative is not regarded as viable.

4.6 RELOCATION WITHIN KANSAS CITY, KANSAS

Selection of this alternative would result in General Motors being able to continue as a corporate citizen in Kansas City, supporting the City through taxes and the economic multiplier effect on that portion of their employees' income spent locally. In addition, General Motors would be in the much improved industrial and financial posture of being able to respond quickly to the rising demand for smaller, fuel-efficient cars. A search for available land with industrial potential resulted in identification of several sites suitable for development of a new plant (see AFFECTED ENVIRONMENT; Section 5.1.2, Site Selection). Consequently, this alternative is recommended for implementation.

AFFECTED ENVIRONMENT

5.0 AFFECTED ENVIRONMENT

5.1 SITE OVERVIEW

5.1.1 Locational Characteristics

The general study area is the western portion of Wyandotte County, Kansas, bound by I-70, proposed I-435, and the County line. Boundaries of the assembly plant site are State Avenue, 118th Street, Parallel Parkway and 110th Street. The truck/rail yard site is located in the southeastern quadrant of the intersection of Parallel Parkway and 110th Street. The proposed rail lead track proceeds south from Wolcott, entering the proposed assembly plant site near Parallel Parkway and 118th Street. Of these roads, State Avenue is the most important, as it is a divided, four-lane facility designated as U. S. Highways 24, 40 and 73. In addition, the site is less than one mile north (straight line distance) of I-70, approximately two miles east of K-7, and one mile west of proposed I-435 (see Figure V-1).

The general area contains several notable sites, including the 1500-acre Wyandotte County-Bethel Park, which has a 330-acre lake; Wyandotte County-Bonner Springs Park, a 540-acre facility; and the Agricultural Hall of Fame.

The Missouri River is located approximately five miles northeast of the plant site, and the Kansas River is three and one-half miles to the south.

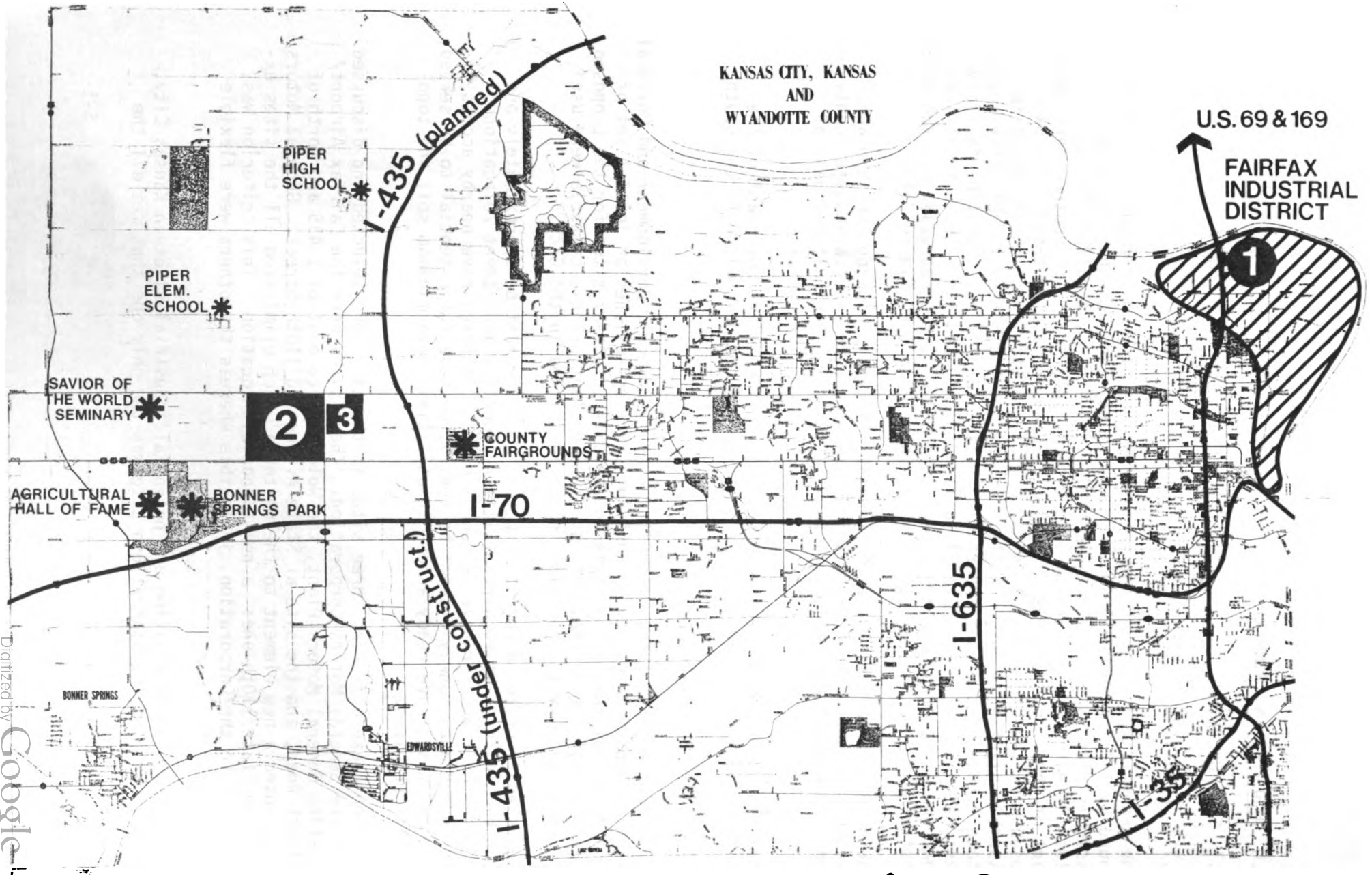
5.1.2 Site Selection

Staff members from the Kansas City, Kansas, Economic Development and Physical Planning Departments and the Port Authority established an initial set of locational suitability criteria to evaluate potential sites for the proposed relocation of the General Motors assembly plant. These criteria were used to compare and evaluate various sites identified in the City.

The relevant criteria were that potential sites must be approximately one square mile in size; require minimal residential and street relocations; be under one owner or have as few owners as possible; have nearby access to the interstate highway system; be served, or have the potential to be served, by a railroad; have ready access to utilities; have minimum soil and topographic problems.

Based on these criteria, three sites in the City were selected and discussed with the General Motors Corporation. These sites were the Fairfax Airport/existing General Motors Plant, the Wolcott Area east of I-435 and north of Wolcott Road, and the site at State Avenue and 110th Street. General Motors later added a new element to the criteria which eliminated all the sites except the State/110th one: a non-floodplain location. This criterion was, according to the Corporation, inflexible whereas the others were flexible to some degree.

Re-analysis of the existing and potential industrial sites in Kansas City, Kansas, revealed the State/110th site was the only one that met all the



5-2

Site Location Map

Figure V-1

1 Existing General Motors Facility
2 Proposed New GM Location

locational criteria and was thus chosen as the proposed site.

5.1.3 Selection of the Rail Route

In the summer of 1980, discussions were conducted with staff members from City agencies, the Port Authority, and General Motors, concerning proposals to provide the new plant with rail service. Both the Missouri Pacific Railroad and the Union Pacific Railroad submitted proposals to serve the plant from existing mainline tracks in Kansas City, Kansas. The Missouri Pacific proposal was selected as being the most efficient, because unit trains can be delivered directly to the proposed plant without being broken up or delayed in switching yards as would have been the case with Union Pacific. In addition, Missouri-Pacific was able to offer other efficiencies as well, including greater financial capacity and positive route factors.

The Missouri Pacific Railroad then investigated six alternate routes bringing rail service to the plant from their mainline tracks at Wolcott. This analysis resulted in the preliminary identification of two routes as the best possibilities for implementation. Of these two routes, one was located adjacent to the I-435 corridor, the other was approximately a mile farther west running, roughly parallel to I-435. Detailed plans were prepared for both routes showing gradients, curve radii, cut and fill areas, structural and drainage requirements, residential relocation, and rail operations on the GM site.

Analysis of detailed plans and further engineering studies resulted in selection of the westernmost route by General Motors and Missouri Pacific as the most appropriate means of providing rail service to the proposed plant. The I-435 corridor route was rejected for numerous reasons, including: a gradient approximately 30 percent steeper than the western route, excessive curve radii, necessity of blasting an 80-foot cut through bedrock resulting in millions of dollars in extra costs, serious operational difficulties on the plant site with respect to internal movement of materials (General Motors engineers in their analysis of the two routes, stated that the I-435 route was unacceptable to GM for these operational reasons), and residential disruption due to location of the tail tracks.

5.2 PHYSICAL CHARACTERISTICS

5.2.1 Topography

The land surface of the general study area consists of gently rolling terrain with occasionally steep slopes and broad, fairly flat uplands. Numerous small natural lakes and artificial impoundments are found in the area. Elevations range from a maximum of approximately 1,060 feet above sea level to a low of 750 feet found in the Missouri River floodplain. The proposed Port Authority site consists of rolling terrain dominated by a broad, flat benchland running east and west and slightly south of the center of the tract. The sides of this benchland slope both north to the Missouri River and south to the Kansas River. These slopes are gently undulating in character.

Relief on the plant and truck/rail yard sites is moderately low, ranging from a high point of about 1,050 feet to a low of 970 feet above sea level, for a total difference of 80 feet.

5.2.2 Soils and Geology

A. Soils

In July, 1980, a subsurface investigation of the proposed site was conducted by Layne-Western Company, Inc. The soil data presented in this section are drawn from the report submitted by Layne-Western to the Port Authority, from United States Department of Agriculture (Soil Conservation Service) soil surveys, and from material furnished by the Kansas Geological Survey.

Basically, several layers of soil (top soil, silty clay, and clay) at varying depths overlay beds of brown sandstone. These materials are loess deposits overlying Kansas Till and glacial outwash deposits. Topsoil occurs in a thin sheet of approximately one-half foot. This layer covers gray-brown silty clays and clay loams which are moist and stiff in consistency. These silty clays transition to sandy silty clays at depths ranging from nine to 13 feet. The sandy clays have similar physical characteristics to the soils directly above them, in that they are grayish-brown, moist, and stiff. Under these sandy clays are found beds of weathered brown sandstone at depths of approximately 19 to 31 feet.

These soils are classified as belonging to the Sharpsburg and Shelby series and have been formed from loess and glacial till. They are moderately well-drained and easily used for agricultural purposes.

B. Geology

Bedrock units directly below unconsolidated Pleistocene deposits include sandstone, sandy shale, and shale of the Stranger Formation and various members of the Stanton Limestone; both these units are of the Pennsylvanian Series. Locally exposed bedrock in the general study area is the Tonganoxie Sandstone Member of the Stranger Formation. This sandstone member is generally lenticular, massive, cross-bedded sandstone and more continuous sandy shale, containing several discontinuous coal beds.

5.2.3 Climate

Climatic conditions in eastern Kansas are typically continental in nature, with warm to hot summers and cold winters accompanied by frequent and rapid variations in wind conditions, cloudiness, temperatures, and humidity. Summer weather phenomena are usually associated with Gulf air masses (high pressure systems) moving in a northern and eastern direction. As a result, summer winds are predominately from the south-southwest. These air masses consist of warm, moist air which provides the area's spring and summer precipitation. Air masses in the winter are from the Arctic high pressure system. These masses and accompanying wind circulation systems generally are cold and relatively dry and move in a southeasterly direction.

The National Weather Service's station at Kansas City International Airport is the closest first-order weather station to the site; the data collected at this station are representative of the general study area and the proposed site.

Annual temperature averages about 56.8°F, with a mean daily maximum of 66.5°F and a mean daily minimum of 47.0°F. The highest temperature on record is 109.0°F and the lowest is -8.0°F. The annual relative humidity averages about 69 percent. The annual precipitation is 34.18 inches. June is usually the wettest month and February the driest.

The annual wind rose from kansas City Municipal Airport for the year 1964 reveals that prevailing winds throughout the entire data period were from the south, occurring approximately 19.34 percent of the time. Wind speed averaged 4.38 meters per second for this data period.

Unstable atmospheric conditions occurred about 15.37 percent of the time; neutral conditions 53.22 percent of the time; and stable conditions 31.41 percent of the time.

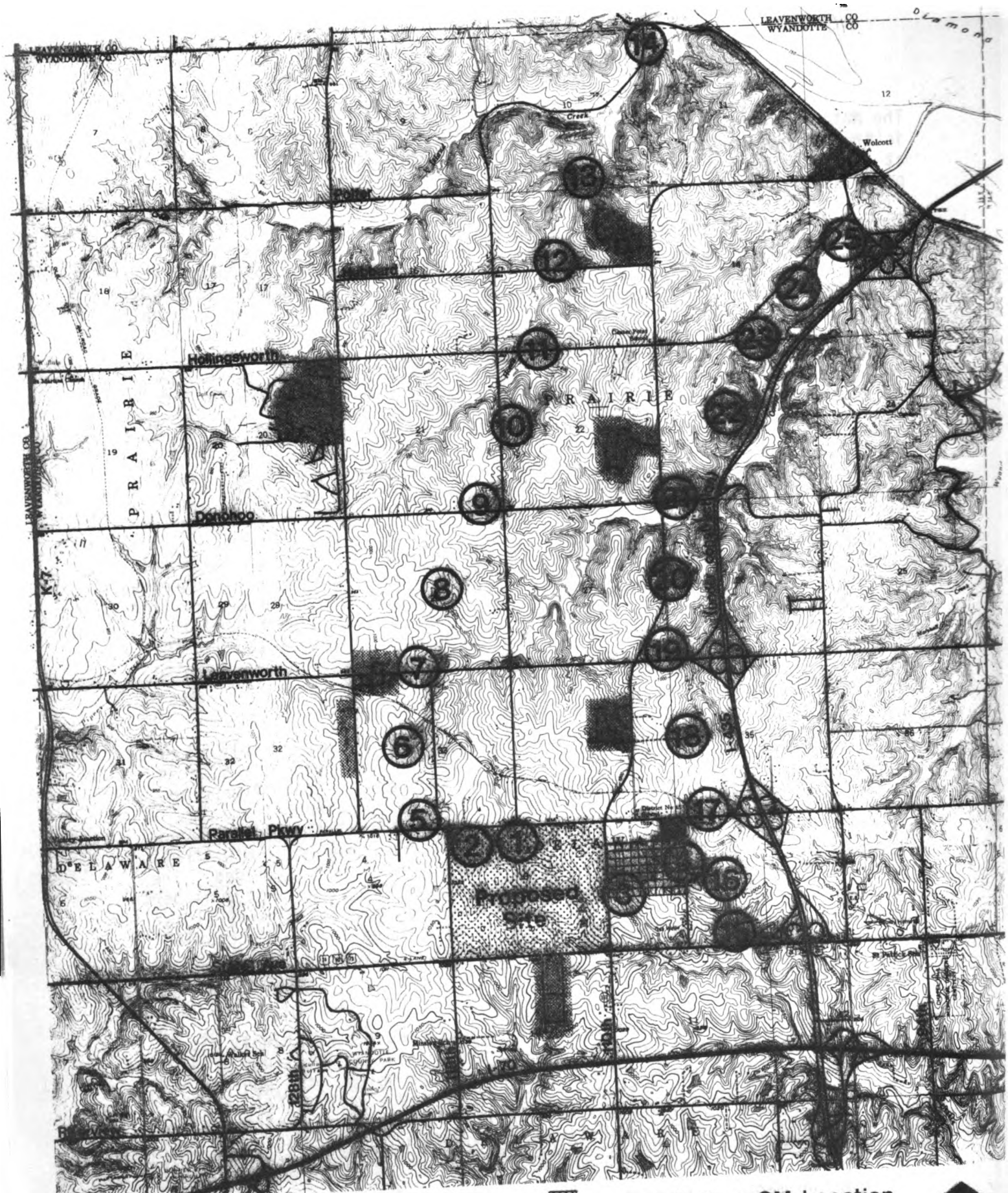
Based on the most recent (1960-65) upper air observations from the National Weather Service Station at Topeka, Kansas (the closest NWS upper air observation station to the plant site), the annual average mixing heights vary from 436 meters in the morning to 1,299 meters in the afternoon. The wind distribution, atmospheric stability, and mixing height data indicate that the study area is in an area of excellent atmospheric transport and dispersion.

5.2.4 Vegetation and Wildlife

The study area is located in western Wyandotte County, approximately 12 miles west of downtown Kansas City, Kansas. The proposed Port Authority site is located between 110th Street and 118th Street and between State Avenue and Parallel Parkway on approximately 530 acres of land (locations 1 and 2, Figure V-2). An additional 175 acres for ancillary facilities and future developments is located to the east of the plant site (east of 110th Street) between State and Parallel. Two longitudinal transects were examined. The first is approximately five miles long and occupies 140 acres. It runs north-northeast from the intersection of 119th Street and Parallel Parkway (locations 4-14). The second, also approximately five miles long and occupying 120 acres, runs north-northeast from 0.5 mile west of 98th Street and State Avenue (locations 15-25). These areas were sampled and the results are presented in Appendix A.

Wyandotte County is flat to rolling at mid-county and becomes highly dissected at the bluffs of the Missouri River to the north. The study area, in western Wyandotte County, Kansas, is located on the upland of a peninsula of land at the confluence of the Missouri and Kansas Rivers. The eastern half of the County is highly urbanized, while the study area consists of open lands on broad ridge tops with scattered woodlands on the slopes along drainageways (Van Doren, et al., 1975).

The vegetation maps of Transeau, et al. (1940), Oosting (1950, Odum (1958),



Sampling Locations for Vegetation and Wildlife

Figure V-2

5-6

Owensby (1980), and Benton and Werner (1958) depict the Kansas City area as being generally ecotonal (or transitional) between the prairie to the west and north and the oak-hickory deciduous forest to the east and south. Deciduous forest intrudes into the prairie along major river valleys and constitutes the forest vegetation of the region. The oak-hickory forest grades into prairie, forming savannah-like vegetation at the interface (Oosting, 1950, and Smith, 1977).

The proposed assembly plant site consists primarily of row-cropped agricultural fields and three drainageway woods, a minor one along State Avenue made up largely of black willow and two larger ones in the north central and northwest parts consisting of mixtures of stream valley species (locations 1 and 2).

The truck and rail yard east of the assembly plant would occupy what is now agricultural and wooded land. The agricultural fields are row-cropped. The woods consist of relatively large trees, most of the oak-hickory association. The area contains considerable forest edge and many of the forest species are excellent mast producers, making this a relatively good habitat, especially for nut-eating wildlife. The encircling homesites on the east, 110th Street on the west, and agriculture on the north and west prevent these woods from being well-sheltered from traffic, people, and cultivation. Evidence of off-road vehicles using the woods casts doubt on its usefulness for larger wildlife, such as deer.

The western transect runs from the northwest corner of the plant site (location 4) to 0.2 mile east of the intersection of 107th Street and Wolcott Drive (location 14). Ecosystems were surveyed at approximately 0.5 mile intervals. The summary of these locations is as follows:

(5) pasture
(6) pasture, sorghum
(7) sorghum, homesites
(8) pasture
(9) pasture, winter wheat
(10) shrubby pasture
(11) shrubby pasture
(12) pasture
(13) pasture
(14) pasture, soybeans

This area, which is 5.87 miles long by 200 feet wide (approximately 140 acres), is agricultural in character. For the most part, native animals and plants have either been destroyed or displaced by agricultural development and activities, and little of strict biological interest remains along this transect. However, edge habitat exists along field margins (fence rows) and along some drainageways and this habitat is useful for some wildlife species such as cottontail rabbit, coyote (reported by one resident), deer, dove and squirrels.

The eastern transect runs from 0.5 mile west of the Wyandotte County Fairgrounds on State Avenue (location 15) to the intersection of Wolcott Drive

and 93rd Street (location 25). Ecosystems were surveyed at 0.5 mile intervals along the transect (just west of Highway I-435). The transect as shown on the map (Figure V-2) is probably carried farther south than it would really go, but it was considered better to examine more area than necessary than less. The summary of these sampling locations is as follows:

(15) sorghum, pasture
(16) sorghum, pasture
(17) pasture, homesites
(18) range
(19) pasture
(20) sorghum
(21) woods
(22) woods
(23) pasture, woods
(24) young woods, pasture
(25) woods

The southern half of this area, which is roughly five miles long and 200 feet wide (approximately 120 acres), is agricultural (locations 15-20) and wooded in the northern half (locations 21-25). The woods are all on steep slopes at the edges of the valley of the east fork of Connor Creek with the exception of location 25 which is on the bluff of the Missouri River. The woods aremade up of large trees (12-24" dbh), mostly of the oak-hickory association interspersed with some basswood. The less common species (for this region) found in these woods include filbert, hop hornbeam, buckeye, pawpaw, bladdernut, and wild ginger. The woods are of biological interest because of the size of the trees, the species found, the fact that forests are ecotonal at best and have been reduced or destroyed by agriculture, and because they provide cover and food to a variety of wildlife in the general study area.

A more detailed description of plants and animal species observed in the study area is given in Appendix A. The study area was sampled between October 30 and November 2, 1980.

5.2.5 Natural Hazards

The proposed site is located approximately three and one-half miles from the Kansas River and five miles from the Missouri River. It is out of the floodplain and floodway of both rivers and all tributaries.

Although the site and study area are located in a region of moderate seismic activity, the area is considered to have low seismic risks (Van Doren-Hazard-Stallings, 1975).

Thunderstorms, hail, and windstorms are climatic hazards occurring with some frequency in the Kansas City Metropolitan Area. Thunderstorms occur on an average of 53 days per year at Kansas City International Airport; windstorms occur an average of 11.4 times per year; and there are 14.3 reports of hail per year.

5.2.6 Ambient Air Quality

This section outlines the existing air quality of the proposed site, with regard to pertinent Ambient Air Quality Standards (AAQS) and local, state, and federal Air Pollution Control (APC) regulations. The site and general study area are part of the Metropolitan Kansas City Interstate Air Quality Control Region (AQCR), and are under the jurisdiction of the United States Environmental Protection Agency (USEPA), Region VII, located in Kansas City, Missouri. It is also within the jurisdiction of the State of Kansas Department of Health and Environment, and the Kansas City-Wyandotte County Health Department (Air Pollution Control Division).

The general study area, including the proposed site, is federally designated as attainment for the National AAQS for particulates, sulfur oxides, nitrogen oxides, and carbon monoxide. Therefore, a new GM plant constructed as a result of the proposed action would be subject to USEPA review to determine compliance with applicable Federal regulations and requirements, particularly Prevention of Significant Deterioration (PSD).

The Federal Clean Air Act of 1970 (P.L. 91-604) does not require state or local AAQS, and neither the State nor the City has enacted such standards. However, states are required by the Federal Government to attain and maintain National AAQS through State Implementation Plans (SIP). In addition, there are local and state Air Pollution Control (APC) regulations which apply to development of the proposed site.

On November 12, 1980, Kansas enacted new, temporary, emergency regulations requiring permits and stringent state review requirements for major new sources in designated non-attainment areas. (The proposed site is in an area with non-attainment status for ozone.) Enactment of these state New Source Review (NSR) regulations was required by EPA as part of the conditions to be met before the federally-imposed construction moratorium on major Volatile Organic Compounds (VOC) sources can be removed. A key portion of the state review process is the federally required determination of whether VOC emissions from the proposed plant will comply with the Lowest Achievable Emission Rate (LAER). This determination is based on national emission limitations and is dependent on what EPA accepts in other states with new automotive assembly plants.

The proposed new General Motors plant is in an area that has been federally designated as nonattainment for the National Ambient Air Quality Standard for ozone. Consequently, before a state air quality construction permit can be issued, GM must demonstrate that the volatile organic compound (VOC) emissions from the new plant are at the lowest emission rate determined to be achievable at the time proposed for construction. It must also be determined that all other sources in Kansas that are owned and operated by GM are either now in compliance or are on a schedule for compliance with all applicable state air pollution emission requirements. GM's other facilities in Kansas include a Delco Battery Plant in Olathe, as well as the Fairfax assembly plant. The Kansas Department of Health and Environment (KDHE) has determined that the Olathe Delco plant is in compliance with all applicable air pollution control emission requirements. The Fairfax assembly plant has

been determined to already be in compliance with all state and local air pollution emission regulations except for the relatively new state VOC emission control regulations. GM has submitted and has received conditional approval for its VOC compliance schedule.

The new plant is expected to be limited to approximately 3200 tons per year of VOC emissions. This VOC emission limit has been proposed as part of the state air pollution control permit. Final action on that permit cannot take place until sometime after the required public hearing on the permit. The hearing was held March 30, 1981.

The Kansas State Implementation Plan (SIP) for ozone provides a margin of growth to accommodate new VOC sources without preventing attainment and maintenance of the National Ambient Air Quality Standard for ozone by the end of 1982. The Kansas SIP currently provides a margin of growth for new VOC sources of about 14,000 tons per year of VOC emissions. Because the approximately 3200 tons per year of VOC emissions anticipated for the new plant is substantially less than the 14,000 tons per year provided as margin for growth, the Kansas SIP does not directly require that GM shut down its Fairfax assembly plant when the new assembly plant starts up.

Because the Kansas SIP provides a margin of growth for VOC emissions that is several times greater than the anticipated emissions from the new assembly plant, the new assembly plant can be constructed and the area covered by the Kansas ozone SIP (which includes all of Wyandotte and Johnson Counties) will still have a substantial margin of growth remaining to accommodate additional new VOC sources without preventing the attainment and maintenance of the National Ambient Air Quality Standard for ozone. If, under a worst case assumption, the existing Fairfax assembly plant continues to operate after the new plant begins full scale production, this will still be true because the 14,000 tons per year of VOC growth allowance in the Kansas SIP assumes that the Fairfax assembly plant with its attendant VOC emissions is continuing to operate when any new VOC sources are added. If the Fairfax assembly plant shuts down or otherwise reduces or eliminates its VOC emissions, there would be a corresponding increase in the margin of growth for VOC emissions.

In summary, even if both GM plants are operated simultaneously under worst possible case assumptions, the attainment and maintenance of the ozone ambient standard in a timely manner should not be threatened and a substantial margin of growth for additional new VOC emission sources will still be available.

VOC emissions are the major pollutant of concern for the proposed new plant, both because the plant is located in an area that is nonattainment for ozone and because VOC emissions are the principal air pollutant emission from an automobile assembly plant. Emissions of particulate matter, sulfur oxides, nitrogen oxides and carbon monoxide are relatively small from the Fairfax facility. Because of the relatively small magnitude of these emissions, as well as because of the relatively short emission stacks at the Fairfax plant, the area of principal air quality impact of these emissions from Fairfax is relatively localized and does not coincide with the anticipated areas of principal air quality impact for the same pollutants from the new plant.

The federally imposed construction moratorium in ozone nonattainment areas applies to the general study area. This moratorium will be removed as soon as the State receives EPA approval for its SIP and "new source review requirements" or when EPA exercises its authority under Section 110 of the Clean Air Act to promulgate specific interim regulations.

5.2.7 Ambient Noise

The objective of this section is to characterize the existing environment in the area of the proposed plant for noise sensitive land uses. In this analysis, the following steps were taken:

1. The noise environment was monitored at three sites in the vicinity of the proposed project.

2. The noise environment of nearby quiet residential areas was tape recorded to assess the fluctuating sound environment at the site.

3. Existing major sources of noise were determined based on personal observations and interviews with local residents.

4. Background sound levels were compared with those predicted by theoretical highway traffic noise modeling.

5. Peak hour L_{10}* levels and day-night equivalent sound levels (L_{dn}) were estimated for the sites in question.

6. These sound levels were then compared with national noise criteria.

A description of sound levels is meaningful only if these levels are presented in relation to criteria or reference sound levels. For the purposes of assessment and documentation of the acoustic environment at the proposed site, three primary sources of suggested noise level criteria were used: the United States Environmental Protection Agency (USEPA) publication, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety" (March 1974); the United States Department of Transportation, Federal Highway Administration "Federal Aid Highway Program Manual," Volume 7-7-3 (May 1976); and the National Academy of Sciences "Guidelines for Preparing Environmental Impact Statements on Noise" (1977). These criteria and recommended guidelines will be used in this section and Section 6.2 in the assessment of the acoustic environment.

Assessment of the existing environment at each site was accomplished through measurements collected during an on-site noise survey. Five sampling stations were chosen around each site to quantify the existing acoustic environment.

*Definitions of acoustical terms are given in Appendix B.

The sample locations are shown in Figure V-3. The findings of this effort are presented in Appendix B with additional detail concerning the noise descriptors. Following is a brief summary of the existing acoustic environment, presented on a site basis.

Sound levels were monitored or tape recorded during this noise investigation at three general study are: near the proposed GM assembly plant, north of the plant at the point of chosest approach of the rail spur to residential areas, and in a residential neighborhood along State Avenue.

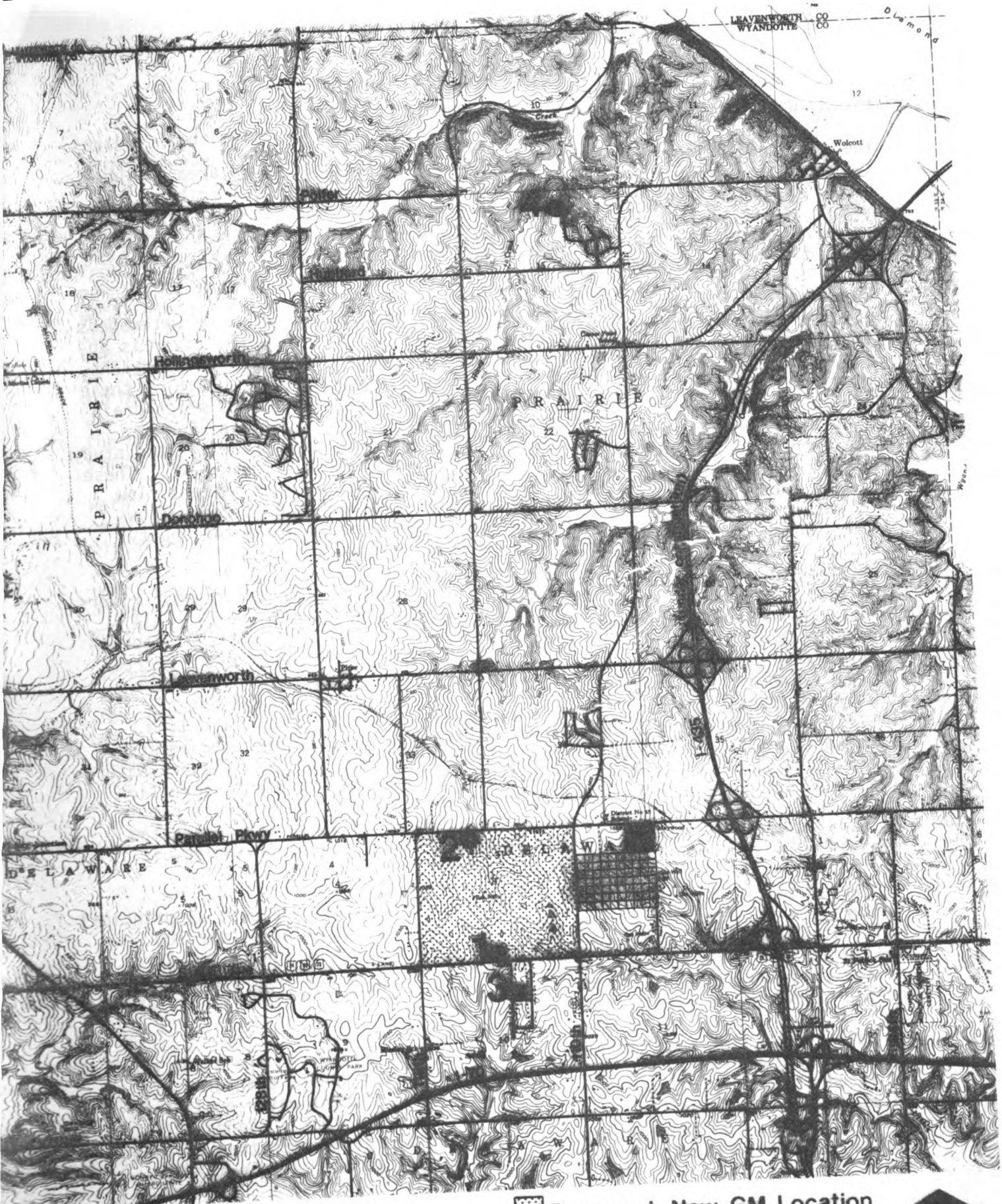
Figure V-3 shows the three sites in close proximity to the proposed GM assembly plant. Sites 1 and 2 are locations of overnight noise monitors. Site 1 is40 feet from the center of the closest lane of State Avenue; Site 2 is 100 yards from Parallel Parkway. Site 3 is the location of the 15-minute tape recording. Figure V-3 shows the location of long term noise monitoring stations (Site 4) near the proposed rail spur, approximately four and one-half miles north of the proposed GM assembly plant. Site 5 is another 15-minute tape recording site to graphically display the time varying nature of the present environment and was made at 55th and State, east of the area shown on Figure V-3.

The major sources of noise at each of the three major areas have been determined. For locations near the site of the proposed GM plant, the background sound levels are produced by I-70 to the south, by traffic along State Avenue, which twice a day, during rush hour, increases the sound levels, and by occasional overflights of small airplanes. Barking dogs, wind chimes and children playing were also identified in this vicinity. During rush hour, sound levels at Sites 1 and 2 are raised due to increased traffic flow on State Avenue and Parallel Parkway.

For the area approximately four miles to the north of the proposed GM site, the background sound levels are produced by dogs barking in the neighborhood, occasional overflights of jets from Kansas City International Airport, and train operations at Wolcott railyards. Since this is a fairly rural area, coyote howls can be heard at night.

For the area farther east, the sound levels are produced by background levels of I-70 traffic, by noise produced by normal operations in the central city of Kansas City, Kansas, and by traffic along State Avenue. Also in this area, there are whistles from trains to the south, as well as the sounds of children playing and dogs barking.

All residential areas farther than 200 yards from major arteries are characterized by an L_{dn} of less than 55. This can be compared to EPA's long term goal of 55 dBA for residential areas (see Appendix B). Most suburban neighborhoods are above $L_{dn}55$ at this time. The study areas are very quiet and typical of a rural/semi-rural environment. Those sites within 200 years of a major artery, such as State Avenue, and Parallel Parkway contain L_{dn} values which range from 71 at Site 1 to 59 at Site 2. These L_{dn} values are dominated by rush hour traffic at 7:30 a.m. and 5:00 p.m. The majority of the L_{10} values are below 70 dBA, the Design Noise Level set by the FHWA (Appendix B).



Noise Monitor Locations
Figure V-3

Proposed New GM Location
Proposed Truck/Rail Yard
Fire Station

5-13

0 2000 4000 6000 8000 10000ft

5.2.8 Water Quality

The inventory of surface water resources in the general study area includes two major navigable rivers, several of their small, perennial tributaries, numerous intermittent streams and drainageways, a large man-made lake, and scattered smaller lakes and ponds, both man-made and natural. Groundwater resources are limited, consisting of a shallow aquifer of unconsolidated deposits over sandstone beds.

The proposed site spans the drainage divide between the two major watersheds in the area. The Missouri River Basin drains to the north--the river is approximately five miles northeast of the site; the Kansas River Basin drains into the Kansas, about three and one-half miles to the south. Both of these watersheds encompass, within the study area, several sub-basins which drain into low-volume, perennial streams. The Missouri Basin contains Connor, Eddy, and Honey Creeks. Tributaries of the Kansas River located in the study area are Little Turkey, Betts, East Mission, and West Mission Creeks. These small, perennial streams are themselves fed by numerous intermittent flow streams during periods of high-volume runoff. In addition to these flowing waters, another major water resource in the area is Wyandotte County Lake, located approximately three miles northeast of the site.

The state agency charged with monitoring the quality of these streams, rivers, and lakes is the Kansas Department of Health and Environment (KDHE). All waters in Kansas are grouped by KDHE into either Class A or Class B, depending upon their uses. Class A waters are protected for body contact recreation (where the human body may come in direct contact with the raw water to the point of complete submergence); preservation and propagation of desirable species of fresh, warm-water aquatic biota, semi-aquatic life, waterfowl, and wildlife; public and industrial water supplies; and agricultural uses. Class B waters are protected for the same uses as Class A waters, except that they only need to be suitable for secondary contact recreation (intended for uses such as fishing, where ingestion of the water is not probable). All of the streams and rivers identified above are designated as Class B waters. Since Wyandotte County Lake is used for swimming, it is classified as Class A.

The water quality standards applicable to Class B waters include, as principal criteria, a fecal coliform count no greater than 2,000 colonies per 100 milliliters (ml), and a dissolved oxygen concentration no lower than five milligrams per liter (mg/l). The standards for Class A waters are the same as for Class B, except that the average fecal coliform content may not exceed a geometric mean of 200 colonies per 100 ml.

No data are available on the water quality of the streams in the study area. Data on the two rivers (see Appendix C) indicate the KDHE's standards are violated almost all of the time. Data on the significant water quality indicators for Wyandotte County Lake show that it meets KDHE's standards for Class A waters. On average, the fecal coliform level is less than 20 counts/100 ml. and the concentration of dissolved oxygen at the surface is 7.2 mg/l.

Another important component of the water cycle besides these surface waters is groundwater. The exposed and shallow subsurface rocks that are present in the vicinity of the proposed site include a variable thickness of unconsolidated deposits, which together with the underlying sandstone beds that occur generally in this area constitute the shallow groundwater aquifer and the principal aquifer in the local area. Depth to water probably ranges from less than five feet in some of the low areas along the drainageways to perhaps 30 feet in higher parts of the topography. There may be a groundwater divide that approximates the surface divide but on a much smaller scale. Recharge to the groundwater reservoirs occurs through the local unconsolidated deposits, then moves downgradient to points of pumping discharge or natural discharge. Natural discharge probably occurs in the form of springs or seeps or by evapotranspiration. The latter happens in drainageways flowing north to the Missouri River and south to the Kansas River, wherever the drainage cuts near or into the Pennsylvanian Age bedrock and thus intersects the water table in the shallow aquifer.

Water quality in the shallow aquifer may be characterized as a calcium bicarbonate type of water having a hardness of about 150 to 300 mg/l and dissolved solids of about 200 to 450 mg/l. The groundwater is generally suitable for domestic use without treatment, although some domestic water users may soften the water with home water softeners. Well yields in Section 3 and adjacent sections could range from about one to about 30 gallons per minute from the shallow glacial and sandstone aquifer. Wells drilled into the underlying alternating limestones and shales generally yield little or no water or poor quality water unsuitable for domestic use. Deeper rocks that might yield large quantities of groundwater contain water unsuitable for general domestic, industrial or municipal use and have dissolved solids of 10,000 mg/l or greater. In Wyandotte County, the Tonganoxie Aquifer is used by a few farmers for irrigation but is not used for domestic purposes due to its low quality and quantity.

5.3 SOCIOECONOMIC/LAND USE

5.3.1 Land Use

A. Existing Land Use

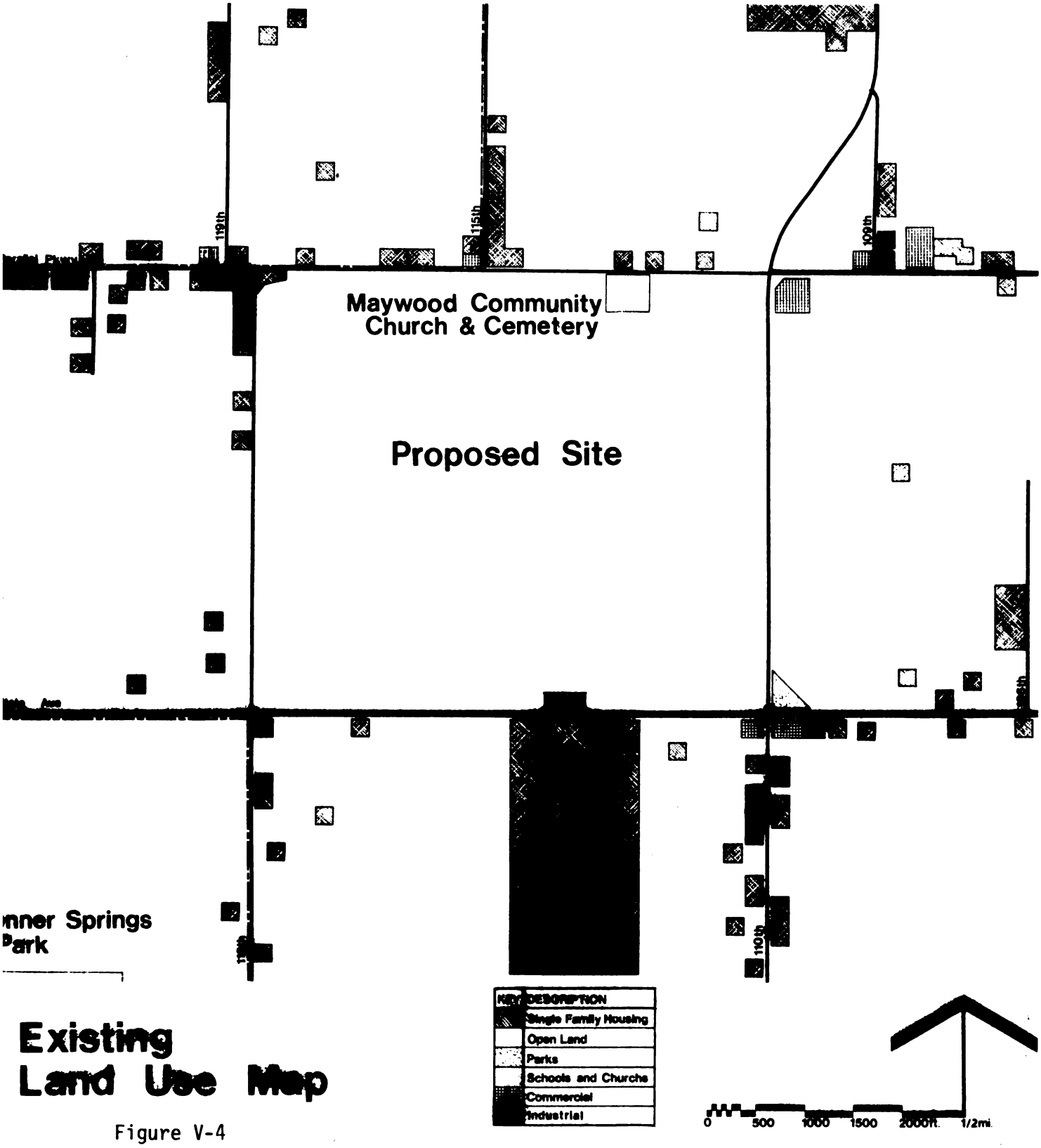
In order to document existing land uses both on the proposed site and in the general study area, available maps and other data were first collected from the City of Kansas City, and then several "windshield" surveys were conducted of the area. These surveys covered the project area and approximately one mile in each direction from the site. The results are presented on the following map (Figure V-4) and the land uses are described below.

The entire area surveyed is part of the urban rural fringe, with agriculture, single-family housing, and several commercial uses dispersed throughout. The proposed site (530 acres) is presently used for agricultural purposes. Approximately one-half of the plant site has been classified by the Wyandotte County Conservation District as prime agricultural land and the remaining portion classified as farmland of statewide importance. All of the truck/rail site is classified as prime agricultural land. On the plant site are three separate inholdings. The first is located on Parallel Parkway approximately 1,400 feet west of the intersection at 110th Street. This parcel includes approximately 4.18 acres and is the site of the Maywood Community Church and Cemetery. The church was built in 1883. The second area is located on the southeast corner of the intersection of 118th Street and Parallel Parkway. At present, two single-family dwellings are situated on 1.19 acres. The third area, located on State Avenue approximately 2,000 feet west of the intersection with 110th Street, is the site of two single-family houses situated on approximately 10.1 acres. Several out-buildings are also located here. These three areas represent 15.47 acres with the remaining 521.80 acres undeveloped for uses other than agricultural. The County, in addition, has purchased approximately four acres for road improvements. The following narrative summarizes the land uses found in the general study area surveyed.

South of State Avenue is primarily agricultural with single-family housing scattered along major streets (State Avenue, 118th Street and 110th Street). A residential subdivision, Delaware Acres, is located immediately south of the proposed site and consists of 68 single-family homes on approximately 80 acres of land. Several commercial establishments and small offices are located on either side of 110th Street along State. Mission (elementary) School of the Bonner Springs Unified School District # 204 is located about one-half mile south of State Avenue on 118th Street.

East of 110th Street is primarily agricultural with single-family housing dispersed along major roads (State Avenue and Parallel Parkway and 106th Street north of State). A commercial site is located on 2.0 acres on the southeast corner of 110th Street and Parallel. An historic marker is located on the northeast corner of 110th Street and State Avenue and commemorates the dedication of the Blue Star Highway (State Avenue).

West of 118th Street is primarily agricultural with single-family housing



Existing Land Use Map

Figure V-4

dispersed along major roads (State Avenue, Parallel Parkway and 118th Street) and includes the Piper community in the vicinity of 123rd Street and Leavenworth Road. Piper Elementary School is at 122nd Street and Leavenworth Road.

North of Parallel Parkway is primarily in agricultural use with single-family housing and small commercial uses scattered along major streets (Parallel Parkway, 109th Street, 115th Street and 119th Street). Several large single-family subdivisions (see Section 5.5.5; Housing) and a major high school complex are located west of Hutton/North 107th Street.

B. Planned Land Use

Land use concepts to guide future development in the general study area have been prepared by the Kansas City Physical Planning Department and are illustrated on Figure V-5. The Physical Planning Department has also prepared a recent report on development in the I-435 corridor. The Comprehensive Plan for this corridor has not been approved by the City Planning Commission as of this writing and therefore is still preliminary.

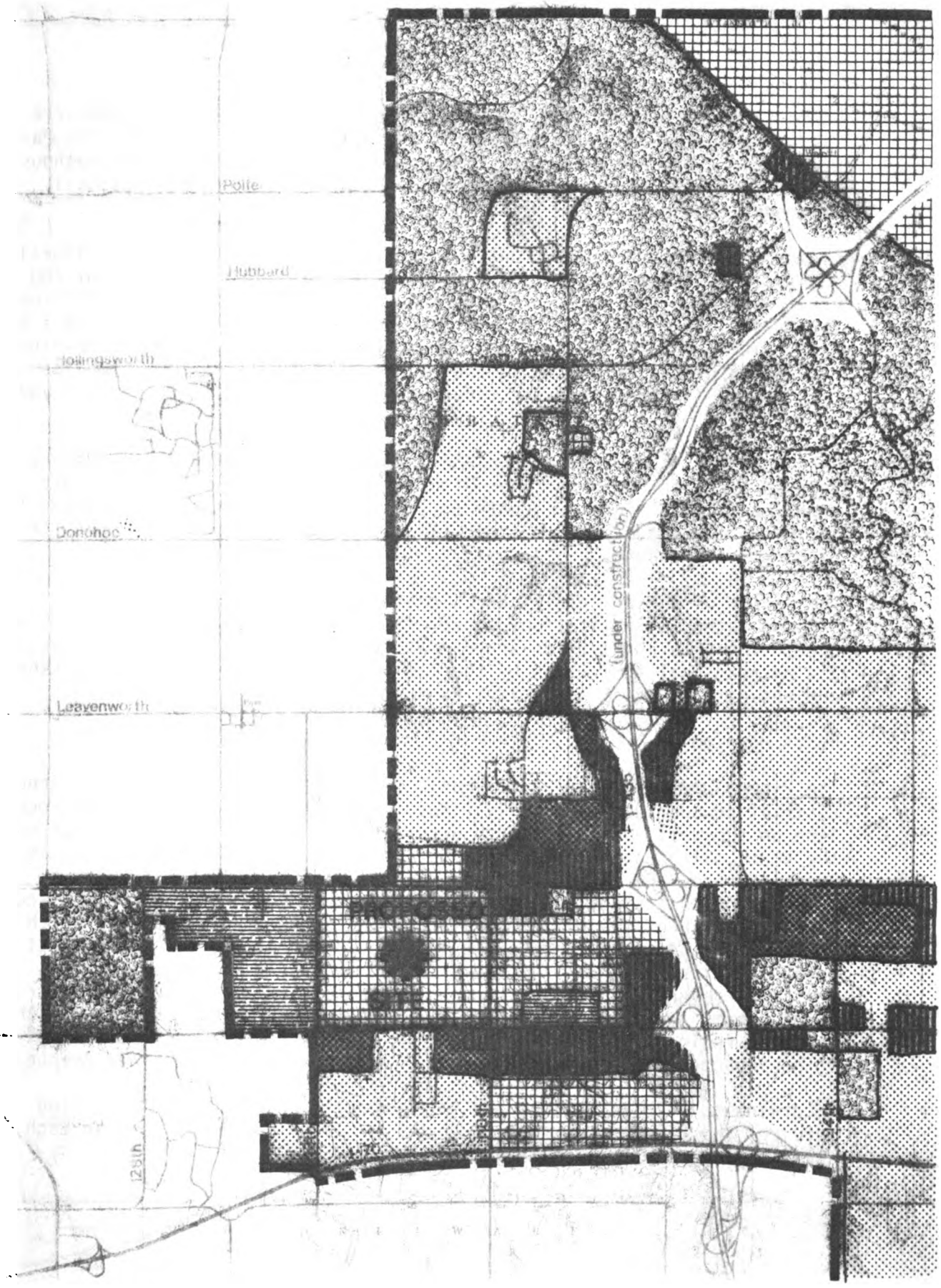
In this Plan, the proposed plant and truck/rail yard sites are shown in three separate use categories. The assembly plant site is devoted to Industrial (Rail Service) use (with the exception of the Maywood Church and Cemetery which is shown as Public-Semi Public). The truck/rail yard site would be used largely for Industrial (Rail Service) with a node of Neighborhood Retail services in the southeast quadrant of the intersection of State Avenue and 110th Street and a five-acre area used as Public-Semi Public.

Land immediately adjacent to the site is planned largely for such intensive uses as Light Industry-Office, Agriculture-Industry Reserve, Medium Density Housing, Neighborhood Retail, and Office-Business Services (PUD). In the general study area, the two dominant planned land use categories are AGriculture-Rural Residence and Urban-Single Family. These recommended uses are found from land bordering the proposed I-435 corridor to the western, northern, and southern City Limits. The I-435 corridor deviates from the dominant pattern, particularly south of Leavenworth Road, with tracts of medium-density multiple-family house, office, commercial, and light industrial uses designated for the Interstate environs.

5.3.2 Open Space, Recreation, and Institutional Facilities

There are several major open space and recreational facilities in the general study area. The largest and most important facilities are parks owned and operated by Wyandotte County. Approximately one mile west of the proposed site, on State AVenue, is the Wyandotte County-Bonner Springs Park, a 540-acre facility providing both active and passive recreation activities. Within the Park boundaries are the George J. Meyn Community Center and the Wyandotte Historical Museum featuring Indian and historical artifacts.

The Wyandotte County-Bethel Park, located near the intersection of Leaven-



PROPOSED LAND USE (KANSAS CITY, KS., 1981)

- Single Family Housing
- Multi-Family Housing
- Open Space
- Commercial
- Industrial
- Agriculture

Figure V-5

0 2000 4000 6000 8000 10000ft

worth Road and 91st Street, is a 1,500-acre wooded area with a 330-acre lake. Among the recreation features and activities provided at this Park are picnic areas and shelters, a recreation hall, boating and a boathouse, stocked fishing, playgrounds for children, horseback riding, softball dismonds, and tennis courts.

Adjacent to the Wyandotte County-Bonner Springs Park is the Agricultural Hall of Fame and the Museum of Farming. This site has in excess of 200 acres with all structures and developed property fronting on 126th Street. The Agricultural Hall of Fame attracts tourists from both the Mid-West and Great Plains and offers seasonal demonstrations of harvesting, threshing, and horse-pulling. Each fall, the Renaissance Festival is held on the Hall of Fame grounds, drawing thousands of visitors to the carnival-type activities.

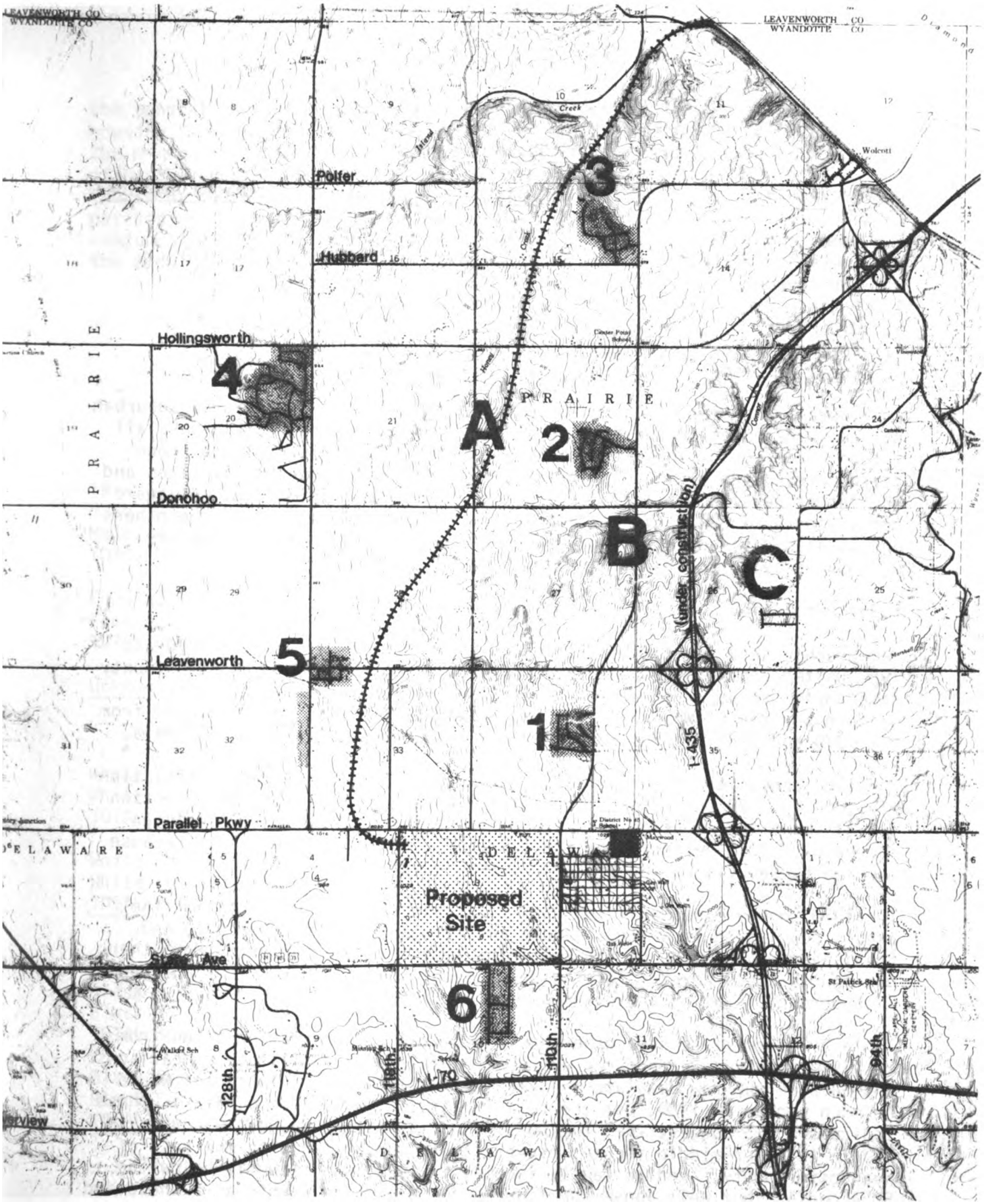
The Wyandotte County Courthouse Annex and the Wyandotte Fairgrounds are located on State Avenue between 94th and 98th Streets. The Courthouse Annex houses a variety of county offices for the convenience of residents. The Fairgrounds are used periodically each year for seasonal events, including the Wyandotte County Fair.

The Savior of the World Seminary, located at 12601 Parallel Parkway, is a Roman Catholic institution devoted to preparing young men for the priesthood. The site consists of approximately 100 acres used for educational and recreational activities by the seminarians and for religious workshops and retreats by the Kansas City, Kansas, Archdiocese.

5.3.3 Housing

The Piper Community is geographically defined in terms of the Piper School District boundaries. Generally, those boundaries are the Wyandotte County line on the west and north, 94th Street on the east, and State Avenue on the south, although a portion of the site and immediate environs are in Bonner Springs USD # 204 and Kansas City, Kansas, USD # 500. For the purposes of this study, the impact area is defined as including that section directly south of the proposed site between State Avenue and I-70 which includes an additional housing development but does not include Wolcott because of its distance from the proposed site. This analysis, then, considers seven (7) distinct housing areas; six are recognizable, discreet developments and the seventh "area" covers scattered rural housing in the affected region. Figure V-6 identifies the six developments most likely to be impacted by the proposed GM move to the 110th Street/State Avenue site.

According to a local builder and the Wyandotte County Multiple Listing Service, the range of current (November 1, 1980) housing values in each of the seven areas are as follows:



KEY RESIDENTIAL AREAS

1 Homestead
2 American Heritage
3 Countryview
4 Prarie Oaks/Leiker Gardens
5 Old Piper
6 Delaware Acres

Figure V-6

0 2000 4000 6000 8000 10000ft

TABLE V-1

HOUSING VALUES

Housing Area	Approximate Valuation	Estimated Average
1. Homestead	$45,000 to $ 60,000	$52,500
2. American Heritage	$57,000 to $ 85,000	$71,000
3. Countryview	$75,000 to $ 90,000	$82,500
4. Prairie Oaks/Leiker Gardens	$60,000 to $120,000	$90,000
5. Old Piper	$30,000 to $ 60,000	$45,000
6. Delaware Acres	$25,000 to $ 80,000	$52,500
7. Rural Housing	$25,000 to $ 65,000	$45,000

In general, the Piper Area can be characterized by its quite rural/suburban nature. The homes in American Heritage, Countryview and Prairie Oaks all sit on large lots. The estimated minimum lot size is approximately one-third acre. Countryview and Prairie Oaks are built around small lakes and the latter development includes a country club and golf course. Delaware Acres (south of State AVenue) appears to be somewhat older than the others and is also divided into large lots. All of the residential areas are surrounded by agricultural land.

5.3.4 Population

Demographic data for the general study area were drawn from the 1970 and 1980 United States Bureau of the Census data and the 1978 Wyandotte County Assessor's Census. The census tracts used include almost the entire western portion of Wyandotte County. Edwardsville data were excluded from the 1970 and 1980 figures but could not be extracted from the 1978 data.

The 1980 census tracts of 447.01, 448.01 and 448.02 had a total population of 5,004 in 1970 and a population of 6,915 in 1980. Figure VI-7 (Section 6.3.3) shows the location and size of these tracts. This represents an increase of 38.2 percent over the ten years, which is significant because the two Kansas Cities and the County show population losses.

The 1978 County Assessor's Census indicates that over 94 percent of the area's population is white. Blacks constitute about five percent, and Spanish-American, make up the remaining less than one percent. More than one-fourth (25.9 percent) of the population is under 18 years of age, and 11.2 percent is at or above age 65. (See Table V-2).

Table V-3 summarizes some other basic demographic information taken from the 1970 Census. Percentages are used because they facilitate comparisons and because the raw data are ten years old. Income, for instance, would be much higher in 1980, but the relative sizes may well be similar. These indicators all suggest that the population in western Wyandotte County is middle to upper-middle income, especially in comparison with the rest of Wyandotte County. Median family income, in 1970, was slightly below the SMSA median, but well above the figures for Wyandotte County as a whole and Kansas City, Kansas. Owner-occupied housing is another good indicator of

the general character of an area. If the percentage of owner-occupied housing is high, then the area is usually financially better off than if the proportion is low. In this case, the study area has a much higher rate of owner-occupied housing than either the County, the City or the SMSA. The labor force participation rates, because they are lower than the comparison areas' rates, suggest fewer two-income families. This fact, in conjunction with the relatively high medium family income, further supports the middle/upper middle income status of the population.

TABLE V-2

1978 AGE, SEX AND RACE CHARACTERISTICS
OF THE STUDY AREA POPULATION

	STUDY AREA POPULATION
1978 TOTAL POPULATION	9,331
Male, under 18	1,16[illegible]
Male, 65 and over	445
TOTAL MALE	4,441
Female, Under 18	1,107
Female, 65 and over	532
TOTAL FEMALE	4,313
Unknown age	575
TOTAL	9,329
White Male, under 18	1,092
White Male, 65 and over	404
TOTAL WHITE MALE	4,179
White Female, under 18	1,024
White Female, 65 and over	499
TOTAL WHITE FEMALE	4,062
TOTAL WHITE POPULATION	8,241
Black Male, under 18	52
Black Male, 65 and over	39
TOTAL BLACK MALE	225
Black Female, under 18	58
Black Female, 65 and over	32
TOTAL BLACK FEMALE	205
TOTAL BLACK POPULATION	430
Spanish-American Male, under 18	18
Spanish-American Male, 65 and over	1
TOTAL SPANISH-AMERICAN MALE	34

Spanish-American Female, under 18	21
Spanish-American Female, 65 and over	0
TOTAL SPANISH-AMERICAN FEMALE	39
TOTAL SPANISH-AMERICAN POPULATION	73
OTHER	10

Source: Wyandotte County Assessor's Census; 1978

TABLE V-3

1970 DEMOGRAPHIC CHARACTERISTICS OF
THE KANSAS CITY SMSA,WYANDOTTE COUNTY AND THE STUDY AREA

	STUDY AREA*	WYANDOTTE COUNTY	KANSAS CITY KANSAS	BALANCE OF WYANDOTTE	SMSA
Labor Force Participation Rates					
Male	76.1	78.5	78.4	79.6	81.5
Female	39.4	45.2	45.6	40.8	47.0
Total	58.1	60.7	60.7	60.1	63.1
Percent of Population Employed	38.0	39.7	39.9	38.1	41.5
Percent of Population with at least HIgh School	49.4	47.2	47.0	51.0	60.1
Median Family Income as Percent of SMSA	97.3	88.7	87.4	98.8	100.0
Percent of Families Below Poverty Level	5.6	9.6	10.0	6.0	6.9
Owner-Occupied Housing as Percent of All Housing	75.2	64.3	63.3	74.7	61.6
Median Value of Housing As Percent of SMSA	90.6	73.6	72.3	86.2	100.0

* Census tracts #447 and #448

SOURCE: 1970 Census of Population and Housing, U.S. Bureau of the Census and PGAU Community Resource Corporation.

5.3.5 Schools

The general study area is located largely within the boundaries of Piper Unified School District #203, which is in both incorporated (Kansas City) and unincorporated portions of the western section of Wyandotte County. The proposed site is split between the Piper District and Bonner Springs USD #204. A small part of the property also lies in Kansas City, Kansas USD #500. The Bonner Springs and Kansas City Districts are not discussed here, as the probable effects on their enrollments are considered minimal.

Historically, enrollment in Piper USD #203 has been low, as shown in Table V-4.

TABLE V-4

PIPER SCHOOL DISTRICT ENROLLMENT

School Year	High School Enrollment	Percentage Change	Elementary School Enrollment	Percentage Change	Total Enrollment	Percentage Change
1970-1971	270		269		529	
1971-1972	298	10.37	290	7.81	588	9.09
1972-1973	347	16.44	332	14.48	679	15.48
1973-1974	376	8.36	387	16.57	763	12.37
1974-1975	373	-.80	431	11.37	804	5.37
1975-1976	381	2.14	428	-.70	809	.62
1976-1977	380	-.26	429	-.23	809	0
1977-1978	383	.79	424	-1.17	812	.37
1978-1979	399	4.18	456	7.55	855	5.30
1979-1980	424	6.27	450	-1.32	874	2.22
1980-1981	408	-3.77	443	-1.56	851	-2.63

Source: Dr. Ron Brown, Piper School District Superintendent: November,1980.

The latest figures indicate a small decrease in attendance, preceded by a similar slight increase in the 1979-1980 school year. In the past decade, the total enrollment changes averaged an annual increase of approximately six percent.

Piper U.S.D #203 district offices and the high school and junior high school complex are located at 4400 North 107th Street; an elementary school is also located at 122nd Street and Leavenworth Road. The former complex is several blocks north of the proposed site and the latter is northwest of the site in the Piper community.

Dr. Ron Brown, Piper School District Superintendent, estimated that, if historical growth trends continue, changes to the existing physical facilities will be required within ten years. In particular, a new junior high school will be required at the existing high school complex, the high school facilities will need to be expanded, and an additional elementary school will have to be constructed.

5.3.6 Commercial Activity and Employment

Because the proposed site is sparsely populated and represents the urban-rural fringe, very little commercial development has occurred. There are no planned shopping centers and only one small industry.

A small commercial strip occupies either side of the intersection of 110th Street and State Avenue just south of the proposed site and includes two older motels, a franchised restaurant, a retail liquor store and two insurance sales offices. A service station with convenience grocery items lies north of the proposed site at 115th Street and Parallel Parkway. East of Sun Savings (at 110th Street and Parallel Parkway) is a small, convenience grocery store, a nursery, and a small manufacturing concern. Office space is limited to the Sun Savings facility and the two small insurance sales offices at 110th Street and State Avenue. The level and nature of commercial activity require local residents to commute to satisfy shopping and enterntainment demands. The minimum complement of basic goods and services usually present in established residential areas is not available in the study area.

Total employment in the general study area is estimated to be approximately 200 persons. The Piper Unified School District #203 employs about 100 persons and is therefore the largest employer in the study area.

Economic activity in the study area is minimal, limited to some agricultural production and a very small amount of unrelated commercial and business activity. The number of residents in the study area, although small, far exceeds the estimated number of jobs and indicates that the majority of the residents commute to jobs outside the immediate area. The apparent high economic status of the residents, as suggested by housing values and interviews with residents of the area, in conjunction with the types of employment opportunities in the study area, substantiate this conclusion. The school district, Sun Savings, and the insurance sales offices are the only activities likely to draw employees from outside the immediate area.

5.3.7 Economic Factors

The Port Authority site contains six pieces of property totaling 537.27 acres. One parcel is owned by the Maywood Community Church and is therefore tax exempt. The church property is 4.18 acres and will most likely not be disturbed. An additional four acres (approximately) has been purchased by the County for road improvements. The actual proposed General Motors site, then, is 530 acres. The 1979 ad valorem taxes paid on these parcels was $8,789.74 on an assessed valuation of $59,490.00. The 1968 market value of these parcels, as recorded by the Wyandotte County Appraiser, was $207,437.

The proposed truck facility site on the east side of 110th Street is a single tract of 180.8 acres. The Sun Savings facility occupies 2 acres, leaving 178.8 acres. This parcel has an assessed valuation of $16,080.00 and paid $2,591.44 in taxes this year (1980).

The City has prepared memoranda analyzing the economic and fiscal impacts of the relocation of the Fairfax facility. These documents, in greater detail are included in Appendix E.

5.4 HISTORIC AND CULTURAL ELEMENTS

5.4.1 Historic Elements

Wyandotte County, which contains the project site, was the scene of several important events in the history of Kansas and the United States. None of these events, however, took place on or near the project site. Most of the important historic places are found to the east of the proposed General Motors site.

The area which is now the State of Kansas was brought under ownership of the United States as part of the Louisiana Purchase in 1803. No "settlement" of the area occurred for about twenty years, until the Chouteau family established a series of trading posts to supply and trade with the explorers, trappers and Indians. The first of these posts, called "the Four Houses", was established near current-day Bonner Springs in 1820. In 1825, the first ferry across the Missouri River began operating, and a treaty was made with the Kansas Indians which moved them 60 miles along the Missouri River.

The next phase of development was accomplished by three relocated Indian tribes referred to as the Emigrant Tribes. These were the Delawares, the Shawnees, and the Wyandottes. They entered into treaties with the United States Government to move from lands in Ohio and Michigan to reservations located near the confluence of the Kansas and Missouri Ribers. The Delawares and Shawnees came in 1830, the former locating north of the Kansas River and the latter south of the river. The Wyandottes arrived more than a decade later.

Development continued at a slow pace until the 1850's. The discovery of gold in California and the push by the railroad interests to build a trans-continental rail line brought increasing demand to develop the area. The Wyandottes responded by organizing a Provisional Territorial Government in 1852 and sending a representative to Washington. This action was not recognized by Congress, but their agitation eventually led to the Douglas Bill of 1854 which created the Territories of Kansas and Nebraska (which at the time stretched all the way to the summit of the Rocky Mountains). The first Territorial Legislature was organized in 1855 after several attempts at framing a constitution.

Several other significant events in the development of Kansas City, Kansas, occurred in the 1850's. First, the Wyandottes signed a treaty with the United States to take their lands in "severalty" (individual ownership), giving up holding them in common. They also thereby became individual United States citizens and they ceased to exist as a separate, independent Nation. Second, two towns were incorporated in 1857--Wyandotte and Quindaro. The latter was founded as the only free-state river port ("gateway") to a state then held by slave-staters. It boomed for about five years until all river ports became accessible, and then finally died because of poor access and rough topography. The Town of Wyandotte, on the other hand, grew slowly but steadily and eventually became the core of Kansas City, Kansas. It received a boost in 1857 when the Territorial Legislature

created Wyandotte County and named the Town of Wyandotte as the county seat.

The 1860's saw development slow because of the Civil War. Although it suffered relatively few battles, Kansas set a large proportion of its men into the war. However, several important events did occur: Kansas was admitted to the Union in 1861; the first railroad bridge across the Kansas River was completed in 1866; the Delaware and Shawnee tribes were "removed" to the "Indian territories" further west in 1867; and the area east of the Kansas River and west of the Missouri state line was incorporated as the original town of Kansas City, Kansas in 1869.

The present town of Kansas City, Kansas, was created in 1886 as a result of an act by the State Legislature which provided for the consolidation of adjacent cities when the resulting city would classify as a city of the first class (population greater than 15,000). The consolidated city combined Wyandotte City, Kansas City, and Armourdale and had a population of over 17,000. Under this same law, Argentine became part of Kansas City, Kansas, in 1910 and Rosedale was added in 1922.

The City continued to grow slowly in theperiod from 1930 through 1979, periodically expanding its land area through annexation. In 1972 it made a major annexation of mostly rural land which includes the project site. This new land has been developed at a slow rate, the project site and the surrounding area remain largely rural in nature.

5.4.2 Archaeological Sites

The State's Historic Preservation Officer and the Executive Director of the Wyandotte County Historical Museum were contacted to determine possible locations of archaeological sites on or in the immediate vicinity of the proposed site. No known archaeological sites have been recorded on or in the vicinity of the proposed General Motors site.

5.4.3 Quality of Life

The quality of life in the vicinity of the proposed site is characteristic of urban-rural fringe areas throughout the Mid-West, combining elements of both life styles. Urban elements in the general study area include residential subdivision developments, embryonic commercial nodes at key intersections, and urban-oriented employment of the residents. Rural elements include large tracts of agricultural land, woodlots, large parcels (10 to 50 acres) with single-family residences whose owners raise horses and other animals, lack of focused commercial activities, and the absence of urban-related traffic, noise, and air pollutants.

This rural ambiance is changing very slowly at present with the establishment and growth of single-family residential subdivisions. When additional growth occurs, the rural environment will be transformed into a suburban community characterized by single-family houses on large lots with a few rural remnants. But at current absorption rates, this transformation would take more than thirty years.

5.5 UTILITIES AND SERVICE

5.5.1 Energy Sources

A. Electrical Power Service

Electrical power is supplied to the general study area by the Kansas City, Kansas Board of Public Utilities. Existing service to the project area is provided from the Maywood Substation, located approximately 1.5 miles east of the proposed site. The primary distribution voltage in the area is 12.47 kv. The Board's standard service would be provided to the new industrial plant by two 161 kv transmission lines installed on single steel poles to two 30/40/50 mva power transformers located on the proposed site. General Motors will pay all costs associated with the second 161 kv transmission line and one power transformer installed at the GM site. The transmission line will be built on private property; rights-of-way will have to be purchsed for this line.

B. Natural Gas Service

Natural gas supply to the site is available from Union Gas Systems, Inc. of Independence, Kansas. That firm owns and operates an 8-inch pipeline that extends along the east side of the proposed site, parallel and adjacent to 110th Street. This in turn is connected to a 26-inch Cities Service Gas Company pipeline located approximately four miles north of the site. Cities Service maintains 400 psi pressure in this pipeline which brings gas from western Kansas, Oklahoma, Texas and Wyoming. They are the wholesale supplier for virtually all natural gas distributors in the eastern part of the State and the Kansas City Metro Area. Their reserves have been increased materially since Wyoming gas was brought into Kansas in June 1979, and service from this supplier is considered reliable.

Union Gas would connect the plant to a new 8-inch pipeline which would parallel their existing 8-inch pipeline from a point along 110th Street at the eastern edge of the site. A meter station will be installed inside the last property line. Union Gas would make the connection and lay this service line at a current cost of $250,000. General Motors would advance the cost of construction and the advance would be refunded to them by Union Gas at the rate of 10 cents Mcf of gas purchased.

The present rate for service for both processing and hearing gas is approximately $2.50 Mdf. The heating content of the gas is approximately 1,000 BTU's per cubic foot.

5.5.2 Solid Waste Disposal

General Motors most likely would continue to use its current solid waste disposal contractor for its refuse removal and disposal needs at the proposed new plant. This contractor, Deffenbaugh Industries, Inc., presently provides two full-time drivers to General Motors' Fairfax Plant. During periods of model changeover and special cleanup the firm will assign from two to four extra full-time drivers.

On the average, Deffenbaugh Industries hauls 280 cubic yards of compacted solid waste per day from the General Motors Fairfax plant to sanitary landfills.

5.5.3 Water Supply

The Kansas City, Kansas, Board of Public Utilities supplies water service to the general study area. The treatment plant is located at 3601 North 12th Street on the Missouri River and provides water service to all of Wyandotte County. The plant received its original certification from the State in 1909; its annual permit from USEPA expires in March. The present capacity of the plant is 60 MGD, with a current peak demand of 52.5 MGD. According to the Board of Public Utilities, planning is presently underway for additional water treatment facilities, transmission mains, and pumping facilities to insure future water needs are met.

The water receives a four-stage treatment process; settling, coagulation, filtration, and disinfection. In the coagulation stage, alum, activated silica, and polymer are used as flocculants. Filtration is provided by a rapid sand filter and chlorine is used as the disinfectant. Finally, the water is fluoridated.

A 36-inch main presently terminates at the intersection of 110th Street and Parallel Parkway. The Board's master plan calls for this main to be extended westward in Parallel Parkway to 118th Street with road improvements planned for that segment. Water service will be available to the proposed plant via a 15-inch tap on the existing 36-inch main.

5.5.4 Sanitary Sewerage

MARC's approved 208 plan calls for wastewater treatment needs in that portion of the general study area which includes the Port Authority site to be served by Kansas City, Kansas, Water Pollution Control Department's Wastewater Treatment Plant (WWTP) #20 via the Little Turkey Creek (LTC) Interceptor Sewer.

WWTP #20, which began operations in Spring 1980, is located at 88th Street and Woodend Avenue on the Kansas River. It has a current capacity of 7 MGD with the potential to handle a peak demand of 21 MGD. On average, current demand is only 2.3 MGD. The plant was designed for eventual expansion to 14 MGD capacity. The facility is a complete mix-activated sludge type secondary treatment plant with aerobic sludge digestion and sludge incineration.

Sewer service from WWTP # 20 to the proposed General Motors site would be provided by the 36-inch diameter LTC Interceptor, which is currently in the planning stages. This interceptor is designed to tie into a newly constructed sewer line (which leads directly from WWTP #20) at 88th Street and Kansas Avenue and terminates on the east side of 110th Street about halfway between State Avenue and Parallel Parkway. Since the LTC Interceptor must tunnel under I-70, it is being designed for an ultimate flow capacity in excess of 1.15 MGD. Construction of this interceptor would

be paid for by the UDAG funds supporting the plant relocation; construction is scheduled to begin in the Fall of 1981.

5.5.5 Police, Fire and Emergency Services

At present, the proposed site is in the service area of the police station located at 81st Street and Minnesota Avenue. The shortest distance from this station to the proposed site is approximately 3.6 miles to the west. According to the Planning and Research Section of the Kansas City, Kansas, Police Department, there are no plans for additional police stations to be located in the more immediate vicinity of the site. However, an additional ten police personnel would be stationed at the existing facility. The existing service force at the 81st Street and Minnesota Avenue Station presently consists of 45 to 50 officers and support staff working three shifts.

The present police service area boundaries for the existing facility are generally the City Limits on the west; I-635 on the east; the Missouri River/Wyandotte County Line on the north; and the Kansas River on the south.

Fire protection services are currently provided to the general study area from Fire Station #19, located at 1011 North 80th Terrace, and Station #4 at 3046 North 81st Street. Station #19 currently houses a 750 gpm pumper, a 100-foot aerial ladder truck, and a 1,500 gallon tanker with pump. Station #4 houses a 1,250 gpm pumper and a brush pumper. These two stations now have an average response time to the proposed site of six (6) minutes.

Emergency medical service is available to the general study area from the Kansas City (Kansas) Aid, Rescue and Emergency Service (KARE) from Providence Hospital at 90th Street and Parallel Parkway. This location is a Type I complete life support system.

5.5.6 Telephone Service

The general study area and the proposed site are presently served by Southwestern Bell's Bonner North central office. This central office provides a local calling scope to all Metro Kansas City (Kansas and Missouri) locations. Toll connecting trunks run between Bonner North and the digital toll switching office in Kansas City, Missouri. This toll switching office has an ultimate capacity of some 100,000 toll switching trunks and is classified as a Sectional Office in Southwestern Bell's toll switching hierarchy.

5.6 TRANSPORTATION AND PARKING

5.6.1 Street and Highway Conditions

The existing roadway network surrounding the proposed site was analyzed to determine present conditions and pertinent characteristics. The areas likely to be affected by changes in traffic circulation due to construction and operation of the General Motors plant in western Wyandotte County are described below.

The four principal or minor arterials immediately adjacent to the proposed site will be most significantly impacted by the plant construction, due to increased trip generation, and plant access-egress requirements. The four are 110th Street, a minor arterial; 118th Street (which does not have a functional classification); State Avenue, a principal arterial; and Parallel Parkway, a minor arterial. The 110th Street segment between Parallel and State consists of two 12-foot lanes, undivided. The 118th Street segment between Parallel and State consists of two 11-foot lanes, undivided. Parallel Parkway, between 110th and 118th Street consists of two 12-foot lanes, undivided. State Avenue between 110th and 118th Street is four 12-foot lanes, divided, with two moving lanes in each direction, and signallized separate left-turn lanes at each major intersection.

I-70 in this vicinity is a divided interstate highway with high-type design standards, full access control, with two 12-foot lanes in each direction, and 10-foot shoulders.

The Route 73-7 corridor is partially access controlled, with two 12-foot lanes in either direction, divided, with isolated at-grade intersections present.

The area in the vicinity of the I-435 corridor, between 102nd Street and 106th Street alignments will be affected by implementation of the proposed action. This area currently consists of agricultural and vacant land, and low density residential sites. If I-435 is built it will be to full, access controlled, interstate expressway standards with three moving lanes in each direction, divided, and with high design shoulders of a minimum of 10 feet. Three sophisticated interchange designs will be used in the interstate section from State Avenue to Leavenowrth Road, consisting of one full cloverleaf, one Par-Clo-B and one directional. If I-435 funds are withheld, the State of Kansas will construct a similar highway in the right-of-way.

A variety of local, collector, minor and principal arterials more distant from the proposed site (but in the general vicinity of a five-mile radius of the plant) may be affected due to area-wide traffic pattern shifts. Relevant streets include Leavenworth Road, 123rd Street, 94th Street, Parallel Parkway and State Avenue in the vicinity of 82nd and 83rd Streets, and State Avenue in the vicinity of the Turner Diagonal.

5.6.2 Traffic Characteristics

The Mid-Americal Regional Council currently categorizes this area of the region as rural, with twelve percent trucks on principal arterials such as State AVenue and nine percent trucks on minor arterials, such as 110th and 118th Streets and Parallel Parkway. The 1980 ADT volumes in the vicinity, factored from 1977 counts, range from a low of 2,000 on 110th Street immediately north of Parallel Parkway, to a high of 13,900 on State between 110th and 118th Streets. Peak hour volumes are ten percent of ADT in this area, and directional distribution is fifty-five percent for the principal arterials, and 54.2 percent for the minor arterials.

The highest 1980 ADT of relevance on Route 73-7 is 10,000, with peak hour volumes being ten percent of ADT. The percent truck traffic for this facility is estimated at eighteen percent ADT, with directional distribution approximated at fifty-three percent.

I-70's 1980 factored ADT volume is 11,600, with peak hour flow being 9.6 percent of ADT, 52.8 percent directional distribution and eighteen percent trucks.

Relevant ADT volumes on other streets in the vicinity range from a low of 600 to a high of 39,100 (see Figure V-7).

Figure V-7

KANSAS CITY KANSAS
1980 TRAFFIC VOLUMES

ENVIRONMENTAL CONSEQUENCES

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 SITE OVERVIEW

6.1.1 Location Characteristics

Impacts generated by implementation of the proposed action on the location characteristics are insignificant. The general study area will be more accessible but this is due to construction of I-435 and previously planned improvements to Parallel Parkway and not the proposed action.

6.1.2 Site Characteristics

The proposed assembly plant site, truck/rail yard site, and railroad line will be impacted significantly by implementation of the proposed action. A modern automobile assembly plant, a truck/rail yard, and a rail lead track will be constructed in an area currently used largely for agriculture and residential uses. A general description of the principal activities and facilities is provided herein.

A. Proposed Assembly Plant

1. Activities

Body Shop

Spot weld sheet metal
Braise and weld joints
Grind and finish

Paint Shop

Dip paint
Spray paint
Sand and finish

Body Trim Shop

Subassembly components
Install components in body

Final Assembly

Subassembly components
Install components
Conduct electrical tests
Conduct mechanical road tests
Conduct MVSS tests (Motor Vehicle Safety Standards)
Complete final repairs

Powerhouse

Generate steam for air conditioning, heating and process air using coal and natural gas

Maintenance Shop

Build and repair tools

Railroad Yard

Load and unload material, ship finished autos

2. Facilities

BUILDING AREAS

Assembly Plant

First Floor:	Total Area	= 2,900,000 sq. ft.
	Usable Area	= 2,880,000 sq. ft.
Mezzanine Areas:		73,000 sq. ft.
Roof Structures:		450,000 sq. ft.

Satellite Facilities

Administration Building	94,500 sq. ft.
Powerhouse	160,000 sq. ft.
Waste Treatment Building	7,600 sq. ft.
Solids Separator Building	1,000 sq. ft.
Primary Switch House	3,800 sq. ft.
Pump House	6,600 sq. ft.
Haulaway Building	4,500 sq. ft.
Coal Handling Facility	4,800 sq. ft.

ROOF AND PAVED AREAS

Assembly Plant	70 acres
Waste Treatment Facility and Powerhouse	9 acres
Haulaway and Final Process Yards	40 acres
Interior Roads	10 acres
Parking Lots	30 acres
Storage Pads	5 acres
Truck Marshalling Areas	8 acres
Retention Pond	8 acres
Open Space	235 acres
Number of Parking Spaces	3,500
Rail Marshalling Yard	100 acres
Total Acreage	515 acres

3. General Site Layout

The building plan which will be used for the project is similar to the Oklahoma City layout. Figure VI-1 illustrates the overall plot plan for the plant. The main assembly building will be served with double rail docks through the center of the building with access from two ends. The Body, Paint and Service Departments will be located to one side of the rail facilities while the Trim, Cushion, Chassis and Final Process will be on the other side. This layout has proven very effective for material flow in existing General Motors assembly plants.

Supporting buildings, including a powerhouse, pumphouse, and waste treatment system, are all strategically located near the rear of the assembly plant to minimize the length of trestles and delivery distances to points of usage.

Outbound shipment of passenger vehicles is planned to be achieved through combined truck haulaways and rail loading facilities. These facilities will be located on the side of the site, away from employee parking areas.

A small one-story Administration Building housing a lobby, employee entrance, personnel functions, hospital, data processing and cafeteria area is planned.

The 530-acre site will be occupied by a single-story assembly plant complex totalling approximately 3.5 million square feet in floor space. It will include a small administration building as well as such support facilities as a powerhouse, pump house and waste treatment complex. The remainder of the plant site will be dedicated to employee parking, truck haul-away, storm water control, interior road service, rail circulation and landscaping. The plant will be located on the southern portion of the site, facing south. Parking lots will be located at the front of the plant, with the parts delivery yards to the west, support facilities and the water retention pond to the rear, and product haul-away yards to the east. This arrangement is indicated on the conceptual site plan.

The main plant is a single story building that stands approximately 32 feet in height from floor to roof. The tallest structures on the site will be the powerhouse, which is approximately 100 feet tall, its 250-feet emissions stack, and a 146-foot central exhaust system stack. The height of these 2 stacks is dictated by the Federal Environmental Protection Agency (EPA) after considering surrounding development and climatic conditions. Building elevations indicate the types of materials that will be used in constructing the plant. The assembly area will have a structural steel frame covered in colored insulated metal panels. The administration building will also be constructed with a structural steel frame with walls of pre-cast resinous cement panels having an aggregate surface.

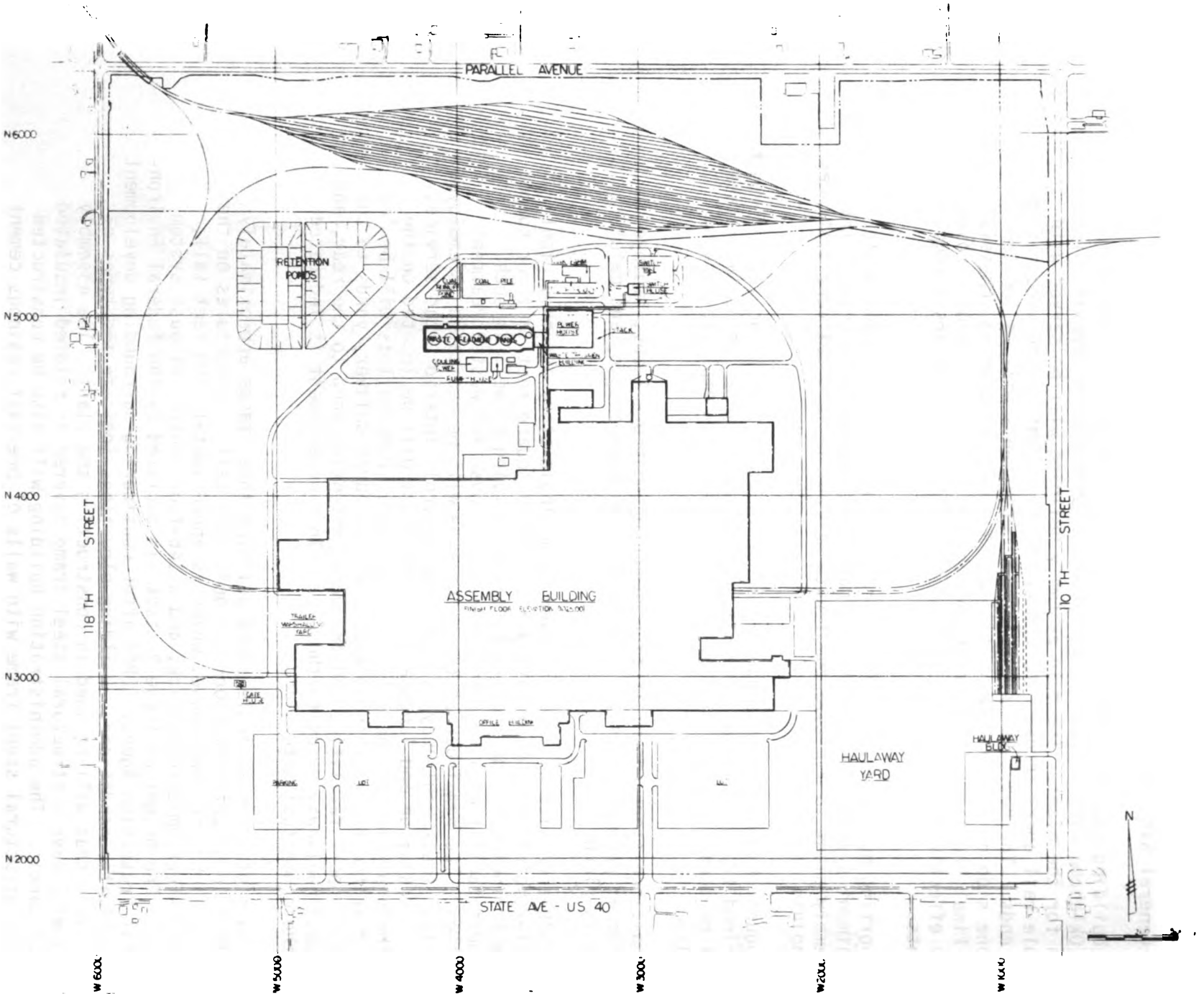


Figure VI-1

Proposed GM Site Plan

Heights of the major facilities and buildings on the plant site include:

main assembly building	-	32' from grade - to main roof level
		52' from grade - to top of conveyor enclosure
powerhouse building	-	100' from grade - to main roof level
central exhaust stack	-	146' from grade - to main roof level
powerhouse stack	-	250' from grade - to main roof level
cooling tower	-	59' from grade - to main roof level
paint oven exhaust stacks	-	10' to 20' from main roof level

4. Internal and External Environmental Aspects

This project includes expenditures for certain facilities required specifically for internal and external environment control. These items are as follows:

A complete industrial wastewater treatment facility will be installed to remove solids and chemically treat liquid effluent prior to discharge into the sewer system.

A redundant water control system will be installed including necessary curbs, dikes, retention tanks, etc. to protect against accidental spills.

An integrated body and sheet metal thermosetting enamel color painting system will be installed for the passenger paint system. This system will reduce hydrocarbon emissions to water borne equivalency.

A common body and sheet metal Elpo prime painting system will be installed for the passenger paint system to reduce hydrocarbon emissions. An Elpo prime system is also included for small parts painting.

In addition to providing the normal process and general plant ventilation, internal environmental control is provided in all make-up houses.

All requirements to meet current OSHA standards with respect to employee safety, handling of hazardous materials, sound levels, male and female toilet facilities, etc. are included.

Baghouses will be used to control boiler particulare emissions.

5. Operations

Work at the proposed General Motors assembly plant would involve three shifts and would continue for 24 hours. However, only the first two shifts (the first from 6:00 a.m. to 2:30 p.m.; the second from 3:30 p.m. to 12:00 Midnight) would be production shifts. The third shift (from 11:00 p.m. to 7:30 a.m.) overlaps the first and second shifts and is a maintenance, non-production shift.

Although it is very difficult to determine a definite schedule of rail operations at this time, some assumptions can be made based on assembly plant shift information. According to General Motors, the proposed plant will be in full two-shift per day operations six days per week, with the first shift from 6:00 a.m. to 2:30 p.m., and the second shift from 3:30 p.m. to 12:00 a.m. Predicated on this information and proper scheduling of inbound materials at connection points (such as Chicago, St. Louis, Memphis, Kansas City, etc.), the following points can be made. Missouri Pacific would have one maximum 65-car road train arrive at the plant at about 1:00 a.m. This locomotive equipment and caboose would then leave as an outbound main line train with a maximum of 65 cars at about 5:00 a.m. A second main line train of 65 cars should arrive at the plant about 12:00 Noon and this locomotive equipment and caboose, with a maximum of 65 outbound cars, would leave at approximately 8:00 p.m.

In addition, a transfer train with a maximum of 25 cars out of Kansas City would arrive at the plant at approximately 9:00 a.m. and leave the plant with a maximum of 25 cars about 11:00 a.m. A second transfer train with a maximum of 25 cars out of Kansas City would arrive at the plant at approximately 6:00 p.m. and leave the plant with a maximum of 25 cars at about 8:30 p.m.

Switching of cars in the General Motors facility would be an around-the-clock job with the first shift beginning around 6:30 a.m.; the second shift about 2:30 p.m.; and the third shift about 10:30 p.m.

B. Proposed Truck/Rail Yard Site

1. Activities and Facilities

Approximately 175 acres south and east of Parallel Parkway and 110th Street would be developed as part of the proposed action. Uses planned for this site would occupy approximately 100 acres with the balance of land uncommitted for any use at this time. The facilities and activities proposed for the truck/rail yard site are described below (see Figure VI-2).

A City fire station will be constructed fronting on Parallel Parkway adjacent to the east boundary of the existing Sun Savings Association property. The station will be situated on a five-acre parcel, will have 10 men per shift, and will house three major pieces of equipment (an aerial truck, a pumper truck and a tank truck).

The Missouri Pacific Railroad tail tracks will be located immediately south of the fire station and Sun Savings Association. This facility will consist of 11.25 acres. The tail tracks will enter the site from the assembly plant under 110th Street. Both the tail tracks and the tracks for the loading and unloading of motor vehicles will be located on this parcel.

The Missouri Pacific tri-level loading facility would occupy 40.72 acres between the tail tracks and New Jersey Avenue. The principal activities

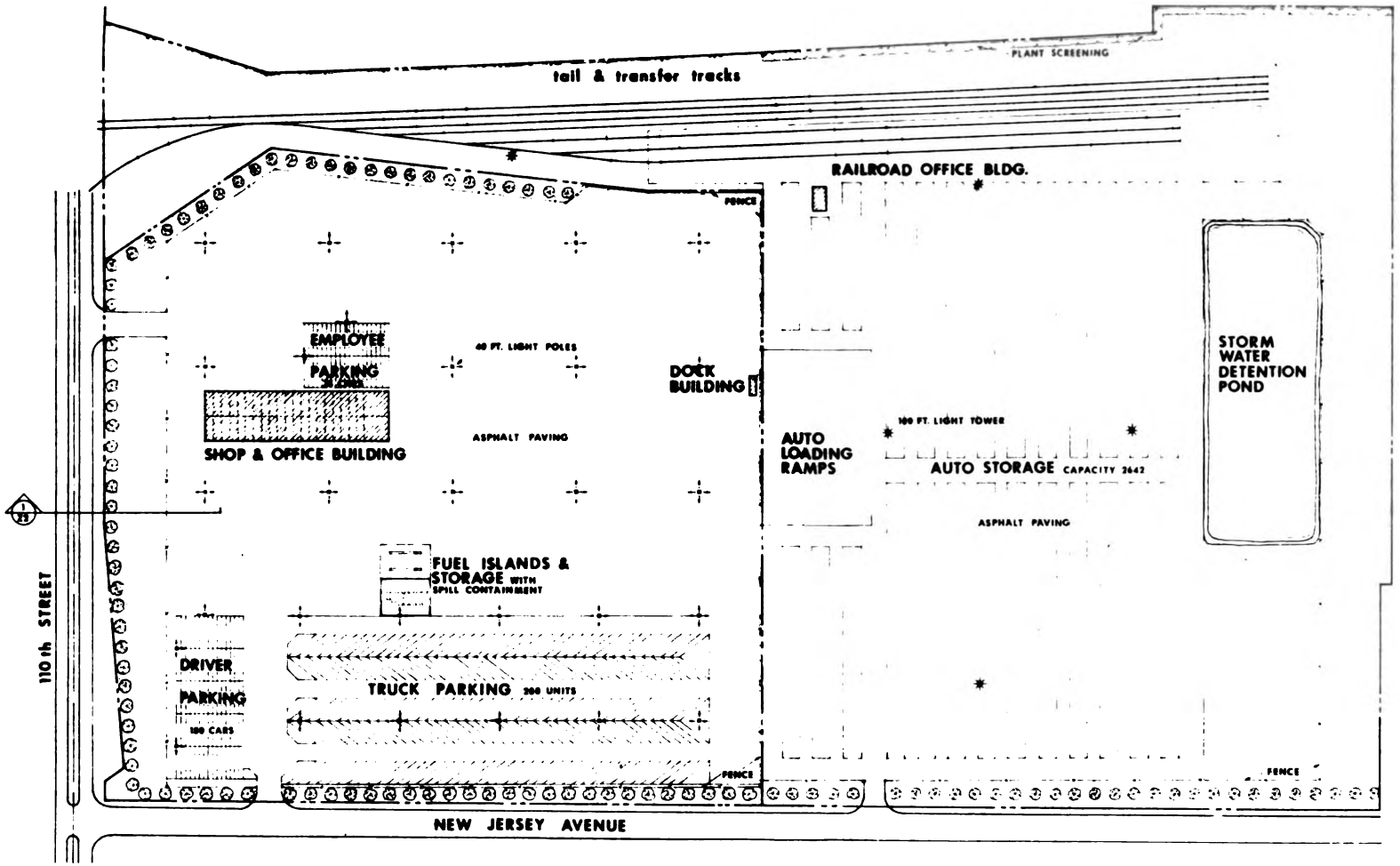


Figure VI-2

Truck-Rail Yard

Site Plan

would be loading, unloading, and storing of motor vehicles. The only building on this site will be a small, one-story office/locker facility (approximately 24' x 50') which will be used by rail workers. On the east side of this area would be located a drainage retention pond (approximately 200' x 1,100'). Most of the surface would consist of an asphalt paved parking area for General Motors vehicles.

The Jack Cooper auto transport facility for the hauling of General Motors vehicles will be located on 37.01 acres south of the tail tracks and between 110th Street and the Missouri Pacific tri-level loading facility. The purpose of this facility is to provide truck hauling of finished cars from the proposed General Motors plant to dealer destinations as well as to and from the Missouri Pacific loading facility.

The final planned use is New Jersey Avenue which transects the southern third of the 175-acre site. This public street and associated right-of-way consists of 4.71 acres and joins 110th Street with the City street system east of planned I-435.

2. Operations

The fire station will, of course, provide 24-hour fire protection and emergency care services to benefit all persons and structures in western Wyandotte County.

Operations on the Missouri Pacific tail tracks will start prior to the beginning of General Motors first shift (6:00 a.m.).

The Missouri Pacific tri-level loading facility will begin operations prior to the first shift and would continue until approximately 5:00 p.m. Trucks would enter and leave the site via New Jersey Avenue and proceed south on 110th Street to the assembly plant entrance or State Avenue.

The Jack Cooper facility will have hours of operation similar to the rail loading facility. Auto transport trucks will leave the facility via New Jersey Avenue, access the assembly plant via 110th Street, and load at the plant's finished product area. Loaded trucks would then proceed to deliver vehicles to various dealers in the Mid-West or to the rail loading facility. This facility will also provide truck delivery of other General Motors finished vehicles brought in via the Missouri Pacific rail loading facility.

6.2 IMPACTS ON PHYSICAL CHARACTERISTICS

6.2.1 Topography

Potential impacts on the proposed site's topographic characteristics are significant as the area has not been altered by urbanization. Considerable earthwork is required to prepare the site for the proposed development. The required earthwork includes clearing, stripping, excavating, hauling, distributing, disposing, backfilling, filling, compacting, and rough and finish grading.

These activities will result in changing the site's existing gently rolling character to one with a flat, almost uniform slope. Finished topographic elevations of the assembly plant site will result in an average height of 1,020 feet.

6.2.2 Soils and Geology

Permanent adverse environmental impacts on soils and substrata at the proposed site are not expected to be a major factor. During initial site grading, the topsoil and rich loam soil layers will be removed and stockpiled on the job site for use in areas proposed to be landscaped. These soils will not be used for fill or backfill purposes on the project. All remaining stripped soil surfaces shall be compacted to aid in building construction and in abating soil erosion. During construction, standard engineering practices will be used to minimize surface run-off and aeolian erosion.

Impacts to geologic substrata will be limited to drilling 1,800 cassons (supports) into the Tonganoxie Sandstone. These cassons will be shallow and are not anticipated to adversely impact the geologic substrata.

6.2.3 Climate

The proposed action will not result in any short- or long-term changes in local climatological or meteorological conditions.

6.2.4 Vegetation and Wildlife

A. Plant Site Ecosystem Impacts

Ecosystems (or habitat types) found in this upland study area include pastures, row crops, mixed forests along drainageways, oak-hickory forests, farm ponds, and intermittant streams. The proposed assembly plant and its related railroad spur will occupy approximately 800 acres of upland. Because the upland averages approximately 90 percent pasture and row crops and 10 percent forest (mostly oak-hickory), approximately 720 acres of pasture/row crop land will be irrevocably utilized for the project. The remaining 80 acres, mostly oak-hickory forest, will likewise be absorbed. These areas include a small quantity of mixed forests and farm ponds which will also be replaced by the project. The ponds are disrupted by cattle and probably have very low numbers of species and individuals. Some drainageway mixed forests will be destroyed, but very little harm will be done. These strips of forest are repeated through drainageways all through the upland and support only limited populations of wildlife.

Intermittant streams will be destroyed in the assembly plant area and altered in the region of the rail spur. Near the spur, streams will be routed through culverts and channeled areas. In the modified portion, invertebrate fauna are expected to decline in species and numbers and become normal again where the streams re-emerge.

Streams may be altered during construction due to increased runoff and trnasport of silt and building materials, but the possibility of alteration will end when construction is completed. Furthermore, so

much land in the area is now tilled that the streams are highly silt-laden following rains; the runoff due to construction may actually add very little in the way of silt load to the streams. As the streams dry up, fish die, survive in pools, or go downstream. Therefore, a resident fish fauna is completely missing and/or very limited in diversity and, thus, will be unaffected by the proposed action.

During construction of the proposed GM assembly plant, measures will be undertaken to control surface water run-off and sedimentation. First, the initial construction contract will include such items as deep storm sewers, retention ponds, and control structures at the ponds. Thus, permanent measures to control run-off will be implemented as early in the development process as possible. In addition, as part of all construction contracts, contractors will be required to implement erosion control measures. Such means as construction of detention ponds at existing drainage outfalls or construction of silt fences around drainage structures are recommended as ways of controlling sedimentation during the construction process.

The project could conceivably increase the silt load in the Missouri River and streams on the floodplain. However, fish populations of floodplain streams are not large enough or diverse enough to be greatly disturbed by temporarily increased siltation. The Missouri River, which is known to contain biologically important or endangered species in some of its reaches, is a heavily silted stream, and any increase in silt load in streams will not significantly influence conditions in the Missouri River.

Implementation of the proposed action will impact area ecosystems by destroying them. Since they are successional in nature and small in total area, their destruction will not be biologically significant, even though individuals of species of little consequence and some low quality wildlife habitat will be lost irretrievably.

B. Rail Route Ecosystem Impacts

The lead track route (locations 5-14, Figure VI-3) passes through more pasture and tilled land than natural habitat, so rail construction would have greater agricultural than biological impacts.

C. Endangered and Threatened Species

The Indiana bat and bald eagle have been identified as the principal nationally endangered and threatened species which may enter the study area. The upland study area does not seem to be a habitat which is critical to the river valley dwelling bat or eagle. Consequently, the project in its totality should have no adverse impact on these species.

D. Wetlands

No wetlands were recognized in the study area although farm ponds and intermittant streams occur. No impacts on wetlands would be expected.

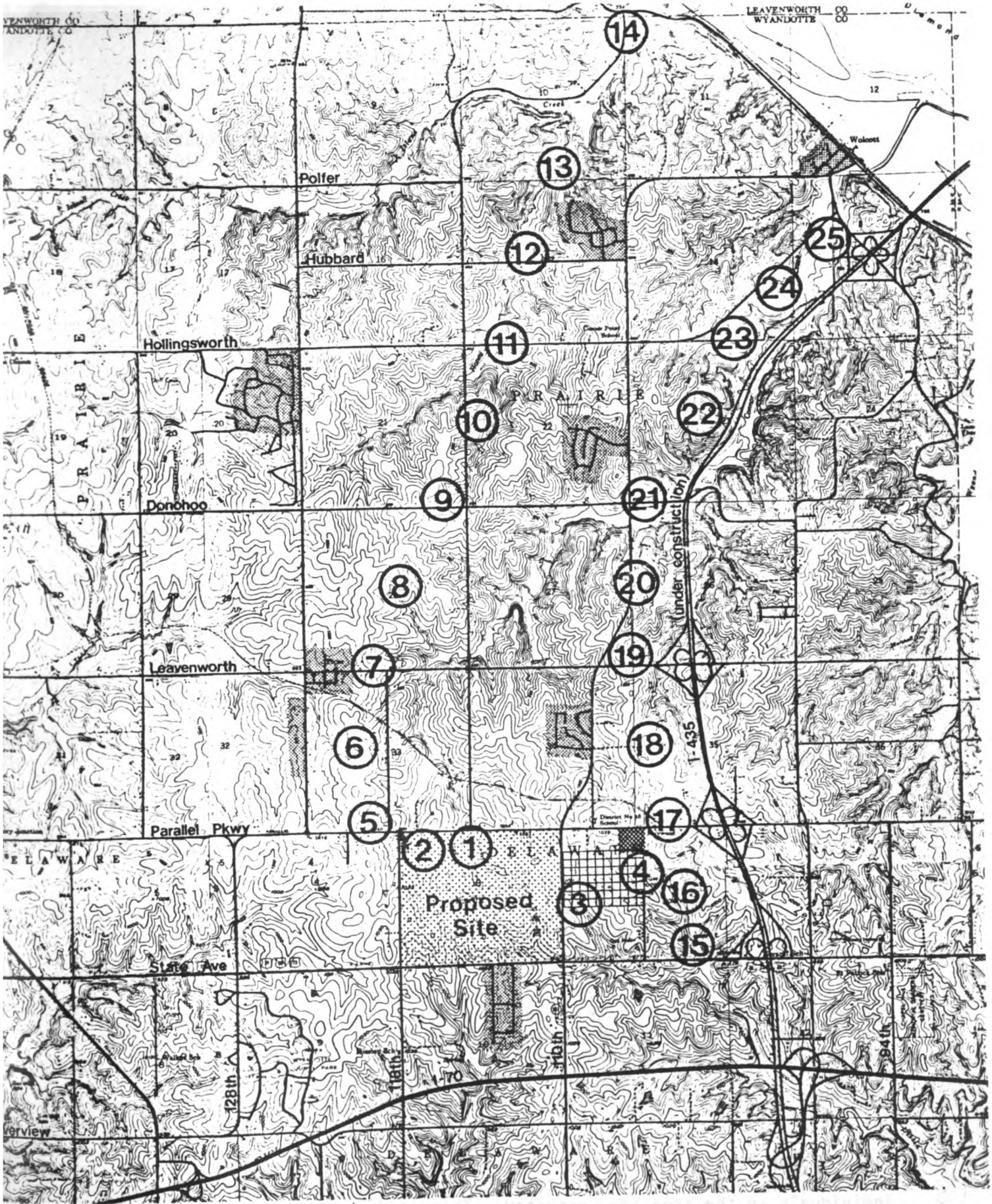


Figure VI-3

Sampling Locations for Vegetation and Wildlife

Proposed New GM Location

Proposed Truck/Rail Yard

Fire Station

6-11

0 2000 4000 6000 8000 10000ft

6.2.5 Natural Hazards

Implementation of the proposed project will not increase the probability of occurrence of any natural hazards at the site or in the general study area, nor will implementation introduce hazards not already present on the site or in the study area.

6.2.6 Ambient Air Quality

A. Plant Related Emissions

In July, 1980, the General Motors Corporation submitted a Prevention of Significant Deterioration Permit (PSD) application for construction of the proposed General Motors Assembly Plant on the proposed site to the Kansas Department of Health and Environment; Kansas City, Kansas-Wyandotte County Health Department; and the U.S. EPA (Region VII). The application was prepared by the consulting firm, Dames & Moore, Park Ridge, Illinois, and is included herein by reference.

The PSD permit application documents expected air pollution emissions from the proposed plant of particulates, sulfur dioxide, carbon monoxide, and nitric oxides. The design and operating parameters for the boilerhouse stack, major spray booth stack, and miscellaneous process and oven combustion vents were included in comparisons of two analytical models (the rural version of U.S. EPA's Real-Time Air-Quality Simulation Model and the Dames & Moore modified rural version of U.S. EPA's Single-Source (CRISTER) Model). The research by Dames & Moore demonstrates the controlled emissions in each case will have minimal impacts on the local air environment. The region is classified as a Class II PSD site. Under this classification, an increment of deterioration is allowed for particulates and sulfur dioxide air pollution emissions. The allowed incremental increase will not be exceeded.

The added contribution of this industry will not cause a violation of primary ambient air quality standards for the community, which are set to protect the health and welfare of humans. In fact, addition of estimated General Motors plant emissions to existing ambient air concentrations of particulates, sulfur dioxide, nitric oxides, and carbon monoxide should not cause violations of the secondary ambient air quality standards, which are more stringent than the primary standards and were set to project humans, animals, and plants against any known adverse effects.

Tables VI-1, VI-2, VI-3 clearly demonstrate that the predicted emissions from the GM plant for sulfur dioxide, particulate matter, nitric oxides, and carbon monoxide do not cause violations of Federal ambient air quality standards. They also indicate that when GM's emissions are added to existing air pollution point source emissions violations do not result.

Since it can be reasonably shown that these standards will not be exceeded, it is appropriate to state that the health and welfare of individuals in the area are protected. This is evident from the

TABLE

VI-1

PREDICTED MAXIMUM SHORT-TERM POLLUTANT CONCENTRATIONS

PRODUCED BY ALL PSD AND EXISTING SOURCES

USING FINE RECEPTOR GRID SYSTEMS AND WORST METEOROLOGICAL PERIODS

POLLUTANT	AVERAGING PERIOD	UTM COORDINATES (km) EASTING	NORTHING	WORST METEOROLOGICAL DATA PERIOD	PREDICTED MAXIMUM CONCENTRATION (ug/m^3)
SO_2	24-Hour Highest	358.10	4332.00	06-05-64	114.32
	3-Hour Highest	327.90	4316.70	01-18-64 (Hrs 07-09)	394.88
TSP	24-Hour Highest	344.90	4332.00	10-23-64	60.10

TABLE
VI-2

PREDICTED MAXIMUM POLLUTANT CONCENTRATIONS
PRODUCED BY ALL PSD AND EXISTING SOURCES WITHIN THE STUDY AREA
WITH APPLICABLE AMBIENT AIR QUALITY STANDARDS
(COURSE RECEPTOR GRID)

POLLUTANT	AVERAGING PERIOD	UTM COORDINATES (km) EASTING	NORTHING	WORST METEOROLOGICAL DATA PERIOD	PREDICTED MAXIMUM CONCENTRATION (ug/m^3)	AIR QUALITY STANDARD (ug/m^3)
SO_2	Annual	362.00	4339.00	---	19.63	80
	24-Hour Highest	358.00	4332.00	06-05-64	113.22	365
	24-Hour 2nd Highest	358.00	4332.00	02-03-64	104.68	365
	3-Hour Highest	328.00	4317.00	01-18-64 (Hrs 07-09)	383.39	1300
	3-Hour 2nd Highest	328.00	4317.00	08-16-64 (Hrs 07-09)	363.39	1300
TSP	Annual	348.69	4329.05	---	4.40	75
	24-Hour Highest	343.70	4331.90	10-23-64	58.78	150
	24-Hour 2nd Highest	348.69	4329.05	07-22-64	41.70	150

TABLE
VI-3

COMPARISON OF PREDICTED MAXIMUM POLLUTANT CONCENTRATIONS
PRODUCED BY THE PROPOSED ASSEMBLY PLANT
WITH APPLICABLE AIR QUALITY STANDARDS AND INCREMENTS*

POLLUTANT	AVERAGING PERIOD	DOWNWIND LOCATION FROM THE SOURCE DIRECTION (degrees)	DISTANCE (km)	WORST METEOROLOGICAL DATA PERIOD	PREDICTED MAXIMUM CONCENTRATION (ug/m^3)	AIR QUALITY STANDARD (ug/m^3)	MAXIMUM ALLOWABLE CLASS II PSD INCREMENT (ug/m^3)
SO_2	ANNUAL	360	5.0	---	2.08	80	20
	24-HOUR HIGHEST	360	7.5	05-05-64	19.18	365	91
	24-HOUR 2nd HIGHEST	360	2.75	05-22-64	18.15	365	91
	3-HOUR HIGHEST	330	1.5	03-31-64	93.73	1300	512
	3-HOUR 2nd HIGHEST	250	1.5	07-26-64	79.27	1300	512
PM[a]	ANNUAL	360	0.5	---	2.37	75	19
	24-HOUR HIGHEST	280	0.95	08-14-64	16.84	150	37
	24-HOUR 2nd HIGHEST	250	1.10	06-05-64	14.64	150	37
NO_2	ANNUAL	360	0.45	---	2.51	100	---
CO[b]	8-HOUR HIGHEST	330	1.5	03-31-64	5.63	10000	---
	8-HOUR 2nd HIGHEST	250	1.5	07-26-64 (Hrs 10-12)	4.76	10000	---
	1-HOUR HIGHEST	330	1.25	03-31-64 (Hr 11)	12.43	40000	---
	1-HOUR 2nd HIGHEST	360	1.00	07-13-64	8.77	40000	---

* Based on 1964 hourly meteorological data.

[a] Modeling for PM emissions was made using rural RAM.

[b] Estimated from the predicted 3-hour and 1-hour SO_2 concentrations to arrive at 8-hour and 1-hour CO concentrations, respectively, using a correction factor of 0.06 to account for the ratio of CO to SO_2 emissions.

SOURCE: PSD Permit Application for General Motors Assembly Plant, Kansas City, Kansas, July, 1980; Dames & Moore.

definition of the standards as specified in the Clean Air Amendments of 1970 (PL 91-601). Once again, this applies to sulfur dioxide, particulate matter, nitric oxides and carbon monoxide emissions from the GMC plant based on the Dames & Moore PSD Report.

There is always the possibility that atmospheric conditions will create isolated situations capable of producing adverse atmospheric concentrations of the above pollutants. It is doubtful that these incidents would be on a regular basis. However, certain individuals (especially those with respiratory and cardio-vascular problems), plants, animals and insects may be adversely affected by concentrations of these pollutants below the ambient air quality standards. The data available on these particular cases are complex and much controversy exists as to their generality. In other words, the field of air pollution is young and many problem areas still exist. It will be many years before a majority of these questions are answered.

The air quality impact assessment by Dames & Moore demonstrated that implementation of the proposed action will result in full compliance with all applicable air quality regulations and standards. Ambient air quality standards are not expected to be exceeded, nor is significant deterioration of ambient air quality levels expected.

General Motors has provided an analysis of expected hydrocarbon (Volatile Organic Compounds - VOC) emissions from the proposed plant processes (see Table VI-4). The report deals only with emission rates and does not contain an ambient air dispersion evaluation. Also, no information is available on the predicted ozone concentrations from the hydrocarbon emissions (VOC). Apparently, the data on the VOC emissions were generated solely by GM. Lack of time and financial resources make it impossible to determine the predicted VOC ambient concentrations and resultant ozone contributions based on dispersion and reaction kinetic ambient air dispersion models.

However, a generalized estimate has been made of expected VOC ambient concentrations based on the carbon monoxide and sulfur dioxide emissions reported by Dames & Moore. General Motors states that 3,190 tons/yr. (159.1 g/s) of VOC emissions will result when the plant is operational. Dames & Moore indicates that 166.0 g/s of sulfur dioxide emissions will be produced by the proposed plant.

Therefore, the VOC emissions are 0.96 of the sulfur dioxide emissions. Based on this weighting factor, an estimate of the maximum VOC ambient concentration can be made. The highest predicted 3-hour sulfur dioxide concentration is 93.7 ug/m^3 (Table 5-5, Dames & Moore). The maximum VOC 3 - hour concentration is estimated as 0.96 x 93.7 $\mu g/m^3$. This results in a concentration of 89.98 ug/m^3. The applicable ambient air quality standard states that a concentration of 160 ug/m^3, 3 - hour maximum between 6 to 9 a.m. shall not be exceeded more than once per year.

No valid VOC monitoring data (ambient air) exist for the Wyandotte County area. Therefore, it is not possible to confirm whether GMC's added VOC emissions will contribute to ambient air quality violations. It would be difficult to make a direct correlation between ambient VOC concentrations and resultant ozone ambient air concentrations in

TABLE VI-4

SUMMARY OF PROPOSED VOC EMISSIONS

Operations	VOC Emissions From Proposed Facility Avg. Hourly (lb)	Annual (tons)
A. Paint Shop		
Prephosphate Cleanup	24.4	62
ELPO	57.0	145
Plastisol	12.5	32
High Temperature - Anti Corrosion	15.0	38
Primer Surfacer	177.0	451
Topcoat	363.0	925
Trunk Coating	39.8	101
Anti-Rust (doors)	26.2	67
Anti-Rust (fenders)	3.8	10
Underbody Deadener	148.5	378
B. Chassis		
Flexible Parts	96.0	245
Wheel Painting	8.3	21
C. Temperature Sensitive Interior Parts	61.5	157
D. Final Repair	26.2	67
E. Miscellaneous Sealers and Adhesives	70.9	181
F. Miscellaneous, Clean Up, Purge, Tanks	99.0	258
G. Powerhouse	33.1	50
H. Maintenance Spray Booth	0.6	2
Total VOC Emissions	1,262.8	3,190

SOURCE: General Motors Corporation; March, 1981.

the region. This is due to the fact that all accepted predicting ozone models require an understanding of the type of hydrocarbons being generated. Specifically, those which are considered to be reactive in nature. General Motors will not know which of the VOC produced at the plant are reactive until the plant is in operation and the emissions properly analyzed.

B. Construction Related Emissions

A generalized chart of the construction schedule is shown in Figure IV-4 Section 6.2.7, to illustrate primary noise characteristics. This chart also indicates portions of the construction schedule which may be responsible for short-term changes in the microscale ambient air quality.

Construction activities primarily cause an increase in particulate loading, which is a nuisance problem and does not represent chronic, long-term impacts on the study area. Site activity of earthmoving equipment, clearing, cutting, filling, grading, etc. will tend to increase particulate levels. These emissions will be more noticeable ton days of high winds, when particulate matter disturbed by construction activity is carried into the ambient air. In most cases these emissions will be kept at a minimum by dust control measures such as periodic watering of dust generating areas and application of dust suppressors by the contractor. These particulate (dust) emissions are short-term impacts which will terminate with the completion of construction activities.

C. Highway Related Pollutant Emissions

The roadway network bounding the proposed site (State Avenue, Parallel Parkway, and 110th and 118th Streets) was analyzed to document the overall effects on air quality in the study area. The emission factors utilized in this analysis are those generated by MARC through the MOBILE 1 EPA computer program. Results of this analysis are listed in Table VI-5. Increases are experienced in the "With Project" projection in all three pollutant categories. In a 1990 development alternative which excludes the proposed General Motors Plant, the pollutant loads are almost double those of 1980. However, the 1990 scenario with the General Motors Plant has pollutant loads almost two-thirds over the non-General Motors alternative.

TABLE VI-6

TRAFFIC RELATED POLLUTANT LOADS
(Tons/Mile/Year)

	1980	1990 Without GM	1990 With GM
CO	1.50	3.00	5.00
HC	.13	.25	.42
NOX	.18	.35	.70

SOURCE: PGAV/Community Resource Corporation; December, 1980.

D. Railroad Related Pollutant Emissions

Air pollutants emitted during operation of the rail marshalling yard, the tail track, and the rail loading yard were calculated.

The first column of Table VI-6 concerns the expected average emissions from railyard activities. It is derived from the emission factors in Table 3.2.2-1 of the U.S. EPA Publication AP-42, Part A, Third Edition. The average emissions were based on a 245-day work year and railroad activity specified by Missouri Pacific. The results indicate that the railroad emissions are only a small percent of the total plant emissions for particulates, sulfur oxides (SO_2) and nitrogen oxides (NO_2) based on the PSD permit report by Dames & Moore.

The table also shows the amount of emissions based on worst case conditions. These being a 365-day work year and are derived from the same table as the previous set. Once again, the particulate, sulfur dioxide (SO_2) and nitrogen oxide (NO_2) emissions are a small percentage of the total plant emissions as determined by Dames & Moore, Corp., in their PSD permit document.

TABLE VI-5

RAILROAD RELATED POLLUTANTS BY ENGINE TYPE

Engine Type	Carbon Monoxide (tons/yr.)	Hydrocarbons (tons/yr.)	Nitrogen Oxide (tons/yr.)
SW-12 (2 stroke supercharged switch)	8.35	18.92	24.89
SD-40 (2 stroke turbocharged road)	30.34	5.31	62.58
Total	38.70	24.23	87.47
Percent of Total	18.4		3.90

SOURCE: Missouri Pacific Railroad and Dennis Lane; February, 1981

A similar analysis can be performed using Table 3.2.2-2 of the U.S. EPA Publication AP-42, Part A, Third Edition. This is based on railroad engine type and provides estimated emissions for carbon monoxide, hydrocarbons and nitrogen oxide (NO_2). It is given below in Table VI-7.

TABLE VI-7

RAILROAD RELATED POLLUTANTS; TONS PER YEAR

Air Pollutant	Estimated Plant Emission a/ (tons/yr.)	Average Emissions from rail yard activities b/	(percent of plant emissions)	Worst Case Emissions from rail yard activities c/ (tons/yr.)	(percent of plant emissions)
Particulates	218.7	7.23	3.30	159.40	4.90
Sulfur Oxides (SO_2)	5,793.0	16.50	0.28	24.60	0.42
Carbon Monoxide	210.6	37.60	17.80	56.00	26.60
Hydrocarbons		27.20		40.50	
Nitrogen Oxides (NO_2)	2,245.6	107.00	4.80	159.40	7.10

a/ Total plant emissions from all sources. Values are found in Dames & Moore PSD report.

b/ Values are determined by using emission factors in EPA Publication AP-42, Part A. Fuel consumption information was furnished by Jack Wesley and assumed 245 working days per year.

c/ Same as b/ except 365 working days per year was assumed in the calculation.

SOURCE: Dennis Lane; February, 1981.

Once again, the nitrogen oxide emissions are a small percentage of the total plant nitrogen oxide emissions.

Although this type of analysis does not conclusively provde that the emissions will have no impact on the community, it is highly unlikely that their addition will cause any hazardous impact on the surrounding air environment. This applies only to the particulate, sulfur dioxide and nitrogen oxide air emissions. In order to validate this condlusion, an air dispersion model should be run incorporating the combined plant and rail emissions. It is possible that under worst case atmospheric conditions the added contribution of railyard activities could adversely impact the surrounding community. However, the occurrence rate of such atmospheric conditions would be small.

The carbon monoxide emissions range from 17.8 percent to 26.6 percent of the total plant emissions as determined by Dames & Moore. This is a relatively high percentage of the total emissions and could have an adverse effect on the area.

6.2.7 Ambient Noise

A. Introduction

The objective of the sound level analysis is to document and assess sound levels generated by implementation of the proposed action at the Port Authority site.

The proposed General Motors plant will have the following general effects on the acoustic environment:

1. Construction equipment and activities at the proposed site will result in moderate, short-term sound levels with some periods of high sound levels.

2. When the plant is in operation, steady state emitters and transient events will cause long-term (for the life of plant operations) increases in existing sound levels.

3. Changes in traffic volumes and patterns caused by the General Motors plant operation will affect long-term increases in existing sound levels.

The criteria utilized to indicate possible noise impacts were taken from the U.S. EPA, U.S. DOT (Federal Highway Administration), and the National Research Council.

B. Construction Impacts

1. Assembly Plant Site

To predict noise levels in the vicinity of the proposed General Motors project site during construction, an acoustic noise model was used to determine the relative importance of each particular equipment type to the noise produced during each phase of construction. The sound levels were then combined, based on their relative importance and expected location of construction using EDI's proprietary computer program MSRAN (Multiple Source Receiver ANalysis). The model used in this study is similar to one developed for the U.S. EPA background document for proposed portable air compressor noise emission regulations, (550/9-74-016 U.S. EPA, October, 1974). It is simple and reasonably accurate, based upon assumptions made in the course of collecting equipment data. Use of the model results in an estimation of the equivalent (energy average) sound level, L_{eq}, emitted from the site during an eight-hour day.

The model basically consists of two components: The equipment maximum A-weighted sound level and the fraction of time the equipment is in its noisiest mode (called the Utilization Factor - U.F.). Equipment sound levels used in the course of this study were obtained from three sources as well as from EDI tabulated data:

1. P. D. Schomer, F. M. Kessler, et al, "Cost Effectivensss of Alternate Noise Reduction Methods for Construction of Family Housing", CERL Interim Report N3, July, 1976.

2. U.S. DOT, FHWA: Special Report, "Highway Construction Noise: Measurement, Prediction and Mitigation", 1977.

3. EPA Report 550/9-76-004 "Noise Emission Standards for Construction Equipment" December, 1975.

Construction activities at the proposed General Motors plant site in Kansas City, Kansas, can be divided into the following phases:

1. Demolition
2. Rough Ground Clearing
3. Utilities
4. Excavation
5. Foundation
6. Above Grade
7. Landscaping
8. Power House

Figure VI-7 shows a time diagram of the duration of each of these construction phases as well as their relative starting and stopping dates. For example, the rough ground clearing phase is performed in conjunction with the excavation phase; duration of this activity is five months beginning at the first month of construction.

Equipment present on the construction site for each of these phases of construction was determined by conversations with Dave Moffit of Barton Mallow, who was contacted at the present Wentzville General Motors construction site near St. Louis, Missouri. Tables in Appendix B present an estimate of the equipment used on site during each phase of construction as well as our estimate of the utilization factor, the maximum sound level, and relative importance of each equipment type. Table VI-8 summarizes the property line sound levels for each phase of construction based upon information given in the tables of Appendix B.

TABLE VI-8

Predicted Sound Levels Due To Building Construction
Sound Level (dBA L_{eq})

Phase	113th & Ann	Cemetery	East Property Line	South Property Line
Demolition, Ground Clearing, Excavation	60.5	65.0	61.3	64.8
Above Grade	55.7	60.0	56.5	59.8
Utilities	49.7	53.2	50.3	53.0
Landscaping/Parking	52.6	56.7	53.3	56.5
Foundation	50.8	54.5	51.4	54.3

SOURCE: Engineering Dynamics International, Inc.; December, 1980.

Table VI-8 contains estimated values of construction noise at property line boundaries. The excavation and ground clearing phase of construction is the loudest. This phase will be completed within five months. Figure VI-4 illustrates the noise contour lines for this phase.

2. Construction of the Rail Spur

There are three phases of construction of the rail spur:

1. Standard construction itself--ground leveling, ballast and laying track;

2. Pile driving for the bridges;

3. Blasting to remove rock.

Standard Construction

Standard construction will produce levels less than Leq 65 at the nearby housing. The levels of noise produced by the construction are typical of those made during the construction of single family housing. The duration of construction is estimated to be less than one month at each housing location.

Pile Driving

Approximately 160 piles will be driven over the 15 days of the pile driving operation. The bridge at Parallel Parkway presents the longest duration of pile driving activity. At that location, 90 piles will be driven in 7 days. The pile driving operation itself will increase the ambient value of Leq very little since each pile takes from 10-80 hits to place, and there is a lot of setup time for each pile. (Although each "strike" of the pile produces a high level of "peak" sound, the contribution to Leq is small since the duration of the "peak" sound is so short.) However, there is a small risk of hearing damage to curious onlookers. All persons within 100 ft. of the pile driving operation should be encouraged to wear hearing protection.

Blasting to Remove Rock

The location of the blasting operation is in the northernmost mile of the rail spur. Approximately 60,000 cubic yards will be removed from the side of a hill. A rock drill will be used to drill the holes, which will then be filled and tapped before blasting. An air compressor will be on-site to power the rock drill.

The major noise impact during this phase is the air compressor on-site and the numerous gravel and dump trucks. The blasting will take place underground, and the "peaks" will last only a short time and will add little to the daily Leq. There is a chance of vibration shaking bric-a-brac in nearby residences, but no damage is foreseen.

The air compressor will yield an Leq of 63 dba at 160 ft. and an Leq of 55 dba at 500 ft. since it will run all day except for short breaks. The trucks will produce levels as high as 75 dba at 50 ft. but will add little to the daily Leq.

3. Construction of the Sewer Intercept Line

The size of the sewer is 24" diameter near the GM site, increasing to 30" diameter approximately 5,000 feet downstream from the GM plant. The location of the sewer line follows Little Turkey Creek to the intersection of I-435 and I-70. Near the interchange it follows the Interstate's right-of-way. The sewer line passes near housing along State Avenue and along Kansas Avenue near 86th Street; otherwise, the sewer line is farther than 500 feet from housing.

Equipment used during the construction of the sewer line:

large backhoes
rock drill (with air compressor)
front end loader
crane
trucks
hand tampers

The construction of the sewer line can be divided into two phases:

1. Laying pipe: digging the trench, adding the fill, lowering the pipe, tamping the fill, covering the trench

2. Blasting through rock: rock drill, fill tamp hole and then blast

Laying the pipe will progress very swiftly. An average rate of production is between 50 and 100 feet per day. The primary noise sources during this phase are the large backhoe and the front end loader. Since the construction progresses at such a fast rate, no residences will receive sound levels above Leq=65 dba for more than one day. Expected levels at 100 feet from the construction site range from 65-75 dba.

There are two sites of possible blasting activities: near State Avenue and near the I-70/435 interchange.

Approximately 2 feet of rock will be removed near State Avenue. No noise impact is anticipated since the change will be small and underground as described above for the rail spur. A compressor will be used to power the rock drill and is the major noise producer (see discussion at rail spur).

C. Noise Environment Without General Motors Plant

The noise environment in the year 1990 in the vicinity of the proposed General Motors plant is projected to be much the same as the existing in 1980. Traffic noise remains the primary contributor to the noise levels. Background levels are primarily due to I-70 traffic. This background level is increased during rush hour periods by traffic noise from vehicles using State Avenue and Parallel Parkway. The neighborhood will continue to remain a rural/semi-rural environment with sound level increases of less than 2 dB over 1980 during off-peak time periods. Figure VI-5 shows the projected 1990 traffic volumes used in this analysis. Table B-12 (in Appendix B) highlights the increase in 1990 traffic noise over 1980 levels. The predicted L_{10} contour lines have been drawn on

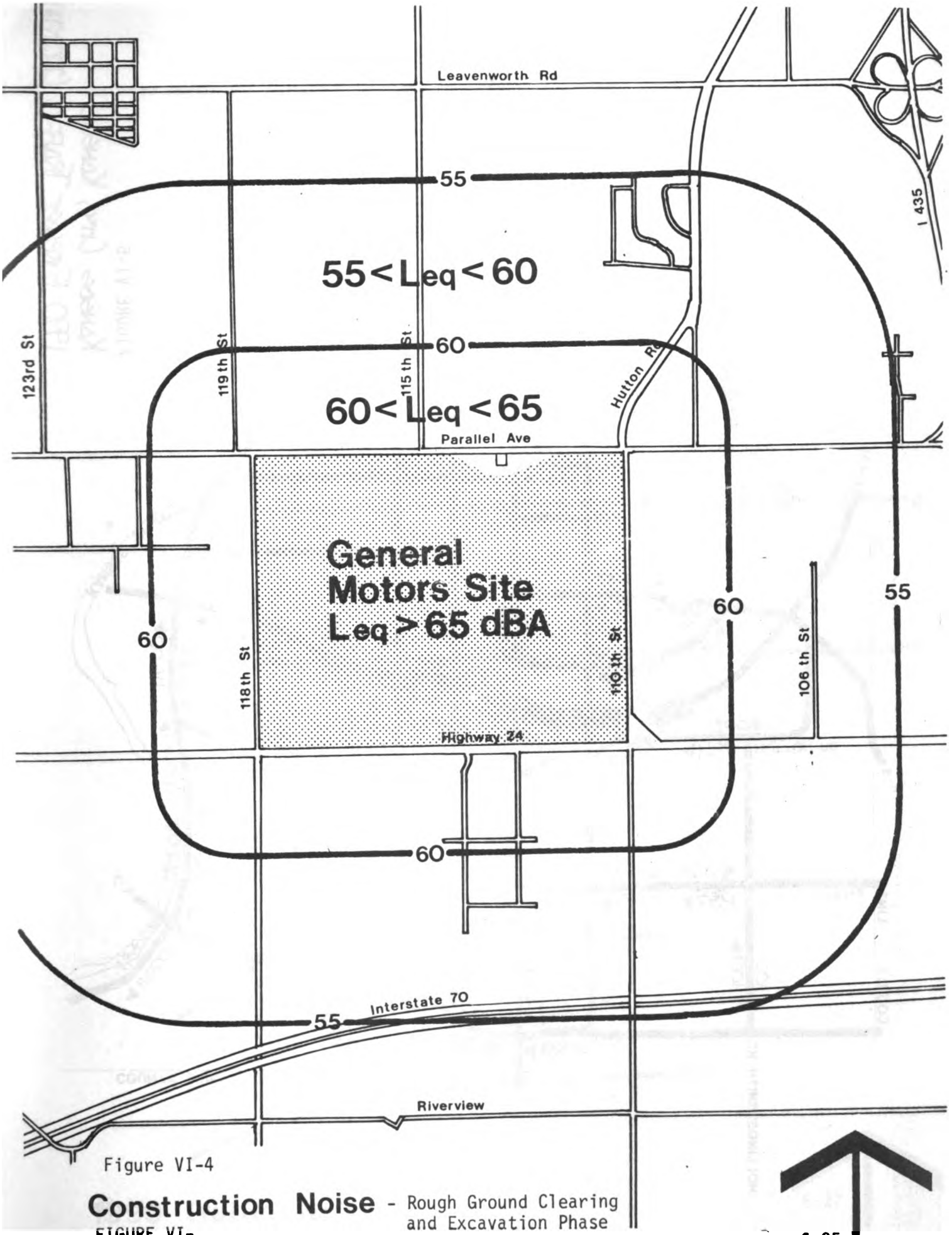


Figure VI-4

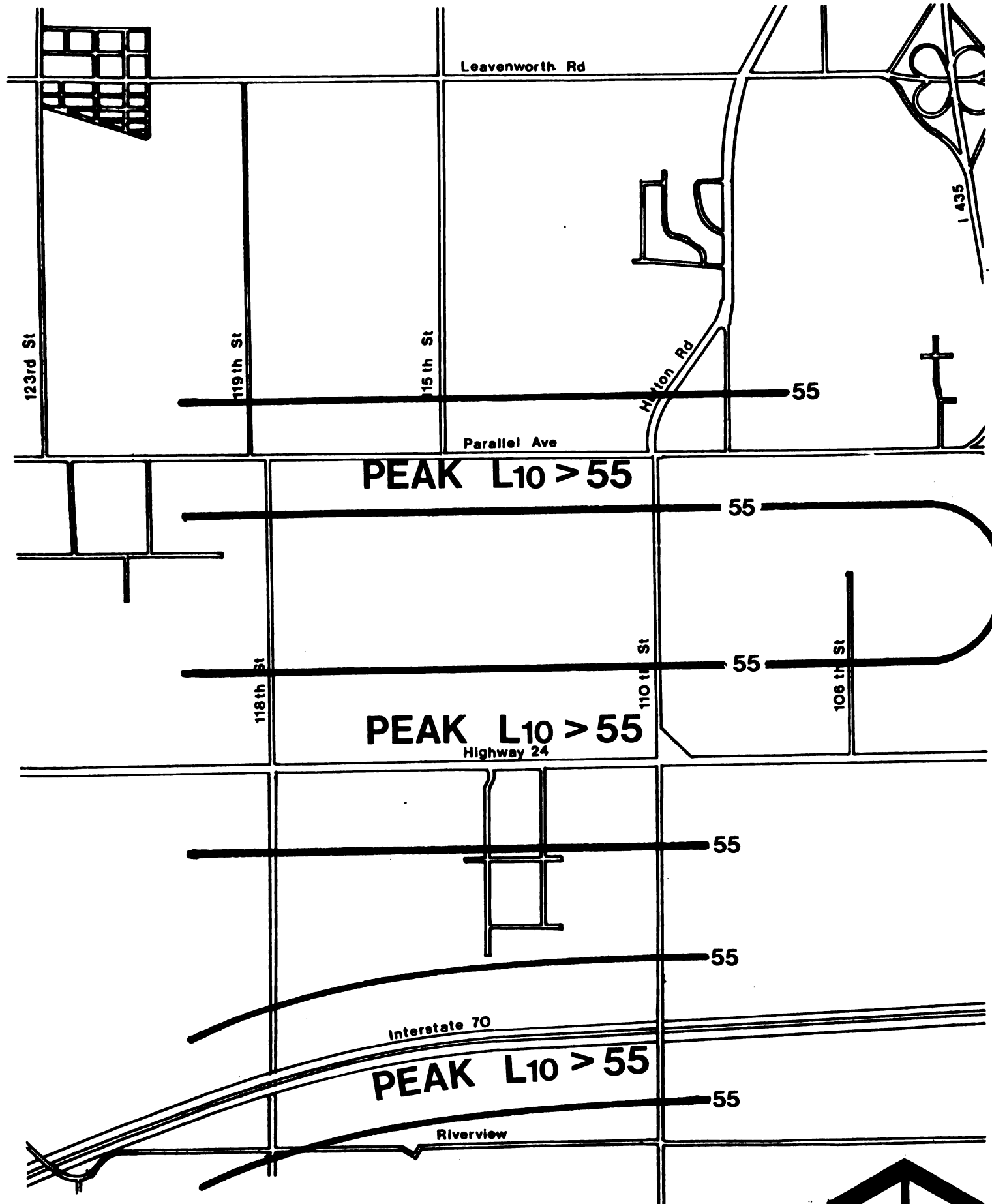
Construction Noise - Rough Ground Clearing and Excavation Phase

FIGURE VI-

FIGURE VI-5

KANSAS CITY, KANSAS

1990 FORECAST TRAFFIC GROWTH



1990 Traffic Noise Without Project

FIGURE VI- 6

TABLE VI- 9

Distance to Noise Contour Lines During Building Construction

Phase	Distance to L_{eq} Value (feet) * 55	60	65
Demolition, Ground Clearing and Excavation	4,500	1,300	50
Utilities	-	-	-
Foundation	-	-	-
Above Grade	1,300	25	-
Landscaping/Parking Lot	300	-	-

*Distance from property line.

SOURCE: Engineering Dynamics International, Inc.; December, 1980.

TABLE VI-10

SUMMARY OF TRAFFIC NOISE IMPACT PREDICTIONS

Road Segment	Year	Veh/Hr.	(MPH)	Distance to L_{10} Contour Line (ft) 70	65	60	55	50	45	113th & Ann
I-70	1980	700	55	112	212	375	675	1,225	2,325	44
	1990	1,200	55	160	278	516	940	1,790	3,591	47
	1990 w/GM	2,200	40	388	713	1,413	2,813	5,512	10,000 +	55
State Avenue	1980	850	55	131	238	413	763	1,412	2,713	51
	1990	1,680	40	206	375	688	1,313	2,612	5,313	55
	1990 w/GM	2,000	15	675	1,325	2,725	5,625	10,000+	10,000 +	65
										L_{10} at Cemetery
Parallel Avenue	1980	420	45	75	156	288	500	875	1,575	63
	1990	1,100	40	163	288	513	938	1,787	3,588	68
	1990 w/GM	1,300	15	500	975	1,975	3,975	8,175	10,000 +	77
I-435	1990	1,300	55	166	291	541	990	1,940	3,846	
	1990	7,500	40	850	1,750	3,650	7,540	10,000+	10,000 +	

* This analysis assumes ten percent commercial vehicles and a traffic noise attenuation rate of 4.5 dB per doubling of distance.

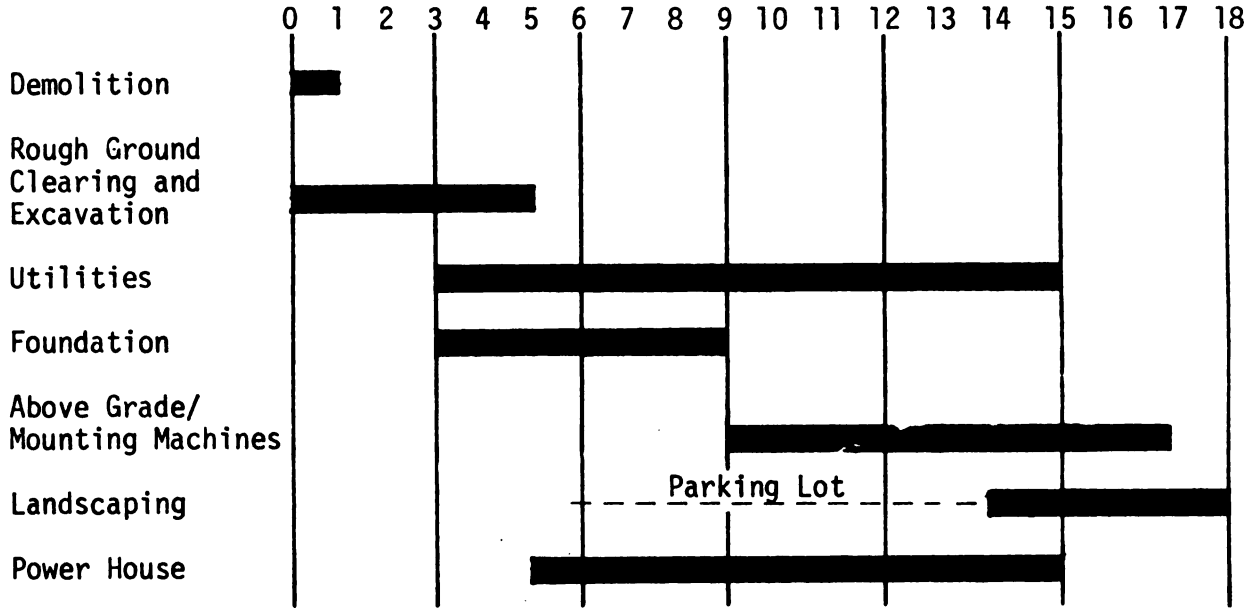
SOURCE: Engineering Dynamics International, Inc.; December, 1980.

Figure VI-6. The increase due to rush hour traffic noise is approximately 3 dB over what existed in 1980 due to the projected doubling of traffic volume on all roads in the area as the roads start to carry design traffic volumes.

FIGURE VI-7

CONSTRUCTION SCHEDULE

MONTHS FROM START OF PROJECT



SOURCE: General Motors Corporation; December, 1980.

D. Summary of Noise Impacts

The study area in question is typical of a rural/semi-rural environment with sound levels below 50 L_{dn} at all residences. These levels are 5 dB less than the EPA's long term goal of 55 dB and 15 dB less than HUD, Veterans Administration, and Corps of Engineers minimum property line standards.

The noise environment due to addition of the General Motors plant to the study area will affect the present noise environment in four ways:

1. Increase sound levels during construction;
2. Increase sound levels due to the proposed plant alone;
3. Increase sound levels due to additional traffic volumes caused by the proposed GM plant; and
4. Increase the sound level in the vicinity of the proposed rail spur to the north of the proposed GM site.

Noise during the construction will be approximately 5 dB louder at the proposed General Motors property line than the sound level during plant operations. The major sound level during construction occurs at the beginning of construction during the ground clearing and excavation phase (for the first five months). Approximately 247 houses will be exposed to sound levels above 55 dBA during this construction.

Noise level due to the proposed plant activities will be less than 60 L_{dn} at the GM property line. This value is 5 dB less than an environment deemed "unacceptable for residential construction" by HUD. However, residences in the study area at present enjoy an environment of 50 L_{dn}, so the noise environment will be perceived as twice as loud as that existing at this time. Approximately 10 percent of the population (currently about 25 houses) within 1/2 mile of the Assembly Plant property line may be highly annoyed by the increase in sound level, but the noise environment will be approximately 10 dB below levels which may stimulate vigorous action (attitudes and other non-acoustical factors may modify this effect) to abate the noise (U.S. EPA, 1974).

Peak Hour traffic noise forms the major impact of siting the GM plant in this study area. Table VI-10 summarizes the traffic noise impact. Those houses exposed to sound levels about $L_{10}70$ may take "vigorous action" due to the presence of the plant. This L_{10} level is also considered to be the "upper limit of acceptable noise" by the Federal Highway Administration; speech communication interference at this level is possible. Since these peak hour design noise levels are identified in HFPM 7-7-3 to be the highest L_{10} values during the day, the speech environment will improve during the remaining, less severe, hours.

Houses along the rail spur will be exposed to rail activity noise for an average of 20 to 25 minutes per day (as estimated by Missouri Pacific spokesman/Jack Wesley). However, no residences will be exposed to L_{dn} 55 or above due to this rail activity. The community reaction to this rail noise will most likely be the same as that due to operation of the proposed plant.

Noise during construction is approximately 5 dB higher at all receiving properties than sound levels which will be generated by plant operation. The major sound levels during construction occur at the beginning of construction during the ground clearing and excavation phase. Noise levels after the plant is in operation are due to the steady state sounds of the plant itself as well as transient activities of the rail yard operations, the coal car shake-out, and the truck receiving/shipping operations. Traffic noise due to shift changes will increase the sound levels over what would be expected in 1990 without the project.

Table B-12 in Appendix B presents the Noise Environment Documentation for traffic noise (as suggested by CHABA Working Group 69). The number of existing houses exposed to various noise levels varies over time and with regard to future action taken. One hundred and fifty-five houses would be exposed to L_{10} levels less than 60 dBA in 1980 and 1990 without General Motors. This number drops to zero with implementation of the project, indicating all houses within the noise study area would experience sound levels in excess of 60 dBA, a significant increase over present levels.

Noise contours developed for 1980 and 1990 without General Motors demonstrate significant increases in the number of houses exposed to L_{10} levels above 70 dBA; this change is a result of higher traffic volumes introduced by I-435. However, in 1990 with GM, this number almost doubles the 1990 figure without GM, indicating that an additional thirty-seven percent of houses in the noise study area would be exposed to these higher noise levels. In addition, the number of houses that will be exposed to sound levels above L_{dn} 60 during construction would be 101, with this number falling to zero houses exposed to greater than L_{dn} 60 after construction.

6.2.8 Water Quality

Two types of wastewater from the proposed plant could potentially affect water quality in the general study area: stormwater runoff from the site and sewage from the plant itself.

A. Stormwater Runoff

With approximately 180 acres of impermeable surfaces around the proposed plant, both surface water and groundwater resources could potentially be adversely affected. The water resources which would be directly affected by construction of the proposed plant are two small intermittant streams in the northwest quadrant of the site and an unknown portion of the study area's aquifer recharge system contained on the site. Both intermittant streams run north from the approximately east-west midline of the tract into culverts which cross under Parallel Parkway--one along 118th Street at the western edge and one just to the west of 115th Street near the north-south center line of the tract. Both would be filled if the plant is built.

The level of impact on surface waters would depend on the adequacy of the design and construction of runoff control facilities. Theoretically, it is possible to eliminate almost all adverse impacts through proper engineering of the stormwater management system. Stormwater runoff from the proposed General Motors plant site will be carried by a system of storm sewers and catch basins to a single, two-cell retention pond sized to hold a 50-year rain below an elevation of 1,000 feet. At this level the proposed total pond capacity is 4.3 million cubic feet, based on 100 percent runoff from 180 acres of hard surface (roof, parking lots, roads) and 35 percent runoff from 360 acres of unpaved land. Each cell will be equipped with a skimmer to remove floating oil, and the water will be monitored for pH and conductivity prior to discharge. The pond will be clay-lined to prevent bottom leakage thereby ensuring that the rate of discharge can be controlled. Normal peak discharge will be 150 cfs. Discharge will be into both of the intermittant streams on site.

There would also be a separate stormwater control system to handle runoff from the coal storage pile. Features of this system include a concrete slab under the pile drains leading to a series of catch basins and a storm sewer to carry the stormwater into a separate retention pond. This runoff would be released at a controlled rate into the plant's sanitary sewage pretreatment system.

The stream bed located near 118th Street drains approximately 80 acres and feeds a small lake. A sufficient amount of water would be discharged into this drainageway to maintain the current level of flow into the lake. The remainder would be discharged into the other intermittant stream.

The retention pond would be able to hold up to an additional 15 feet of runoff without danger of damage to the plant. The outfall structures are designed such that any accidental spill could be retained in one cell of the pond while the 50-year storm runoff is discharged through the other cell at an increased rate of discharge.

This stormwater management system should prevent most pollutants carried by runoff from entering either surface waters or groundwater. The amount of flow required to replenish the aquifer will be diminished somewhat as the large area of impermeable surface and associated drainage system would divert most of the rainfall to flowing surface waters. However, because the site represents only a very small portion of the acquifer recharge area, this impact should be slight.

B. Sanitary Sewage

The total wastewater stream from the plant itself has been estimated to be a maximum 1.5 mgd, with an average of 1.2 mgd for the combined sanitary and process water effluents. Approximately 400,000 gallons per day would be from sanitary use while the remaining volume would be from process use. Sanitary effluent would be discharged directly to the municipal treatment system. Process wastewater would be directed to the plant's wastewater treatment facility. Treatment would consist of several unit processes which are described below.

Solid Settling

Wastewater from the plant flows by gravity through a solids separating tank. An adequate retention time is provided in this tank to allow heavy solids to settle and light materials to float to the top. The separated contaminants are removed from the tank with a drag conveyor and skimmer, respectively.

Holding Tanks

Wastewater is pumped from the solid separator tank into a holding tank. when the holding tank is full, it is taken off line by diverting the wastewater to a second holding tank. The water in the full tank is mixed by a mixing system, and pH is adjusted to maximize contaminant removal.

Clarifier

Wastewater is pumped from the holding tank to the clarifier. Adequate retention time is available for settable solids to be removed from the water. The pH of the effluent from the clarifier is adjusted. As presently planned, effluent from the clarifier will be directed to the municipal sewer system. Solids will be pumped to the thickener tank.

A reclaim water system is not planned at the facility at the present time, although the technical capacity exists to introduce it to the pretreatment system at a future date if desired. In this case, effluent would be directed to the reclaim water system.

Thickening Tank

Sludge from the clarifier is pumped to a thickening tank. Additional chemicals and recycled sludge are mixed into the newly - produced sludge in the thickener to promote solids dewatering.

Blend Tank

Sludge is pumped from a thickening tank to a blend tank. Filter chemicals can be added in this tank which promote solids dewatering in the filter presses.

Reclaim Water System

If a reclaim water system is implemented in the Kansas City facility, water from the clarifier will be pumped through polishing filters where remaining suspended solids will be removed. The filtered water would then be pumped into a reclaim water storage tank for re-use in the plant. A system of this type is not proposed for the Kansas City facility at this time, although the capacity exists within the system for implementation of a re-use program at a future date.

Sludge Dewatering

Sludge removed from the blend tanks is then pumped through a filter press where water is removed.

The anticipated effluent water quality characteristics from the plant's wastewater treatment system are indicated in Table VI-11. These figures were developed by evaluating effluent quality characteristics at other facilities which utilize similar wastewater treatment techniques. Effluent quality from the proposed treatment processes at the new plant were then projected, adjusting for the proposed processing materials and for future effluent quality requirements that may result from Federal pretreatment standards yet to be promulgated. For comparison, existing Kansas City, Kansas, sewer ordinance limitations are also shown in Table VI-11. Operation of the waste treatment system will be fully monitored and controlled by full-time operators through a combination of electronic instrumentation and a regular sampling program.

As shown by the data in Table VI-11, effluent from the pretreatment process meets the City's ordinance limitations for all parameters.

All sewage from the proposed plant would then be delivered to the City's sanitary sewer system for transport to Wastewater Treatment Plant #20, where it would receive secondary treatment before eventual discharge into the Kansas River.

TABLE VI-11

ANTICIPATED PROCESS WASTEWATER
EFFLUENT CONCENTRATIONS

PARAMETER	KCK ORDINANCE	PROPOSED EFFLUENT	BPT ELECTROPLATING DAILY MAX/4 DAY AVG.
Cadmium	1.0	<0.1	1.2/.7
Copper	1.0	<0.5	4.5/2.7
Lead	2.0	<0.2	.6/.4
Mercury	0.3	<0.0005	
Nickel	5.0	<1.0	4.1/2.6
Silver	-	<0.001	1.2/.7
Total Chromium	3.0	<2.0	7.0/4.0
Zinc	5.0	<1.0	4.2/2.6

All concentrations in mg/l

SOURCE: General Motors Corporation, U.S. Environmental Protection Agency, and Kansas City, Kansas, Code of City Ordinances, Chapter 23, Article I-VI

6.3 IMPACTS ON SOCIOECONOMICS AND LAND USE

6.3.1 Land Use

Direct impacts of locating the new General Motors plant on the proposed site are significant. Implementation of the proposed action would introduce industrial use and zoning into a large area of land presently used for agriculture and several scattered single-family residential subdivisions. It would also result in a railroad spur being brought across the existing rural landscape to serve the plant. Furthermore, land abutting affected traffic arteries would be subjected to increased vehicular flow and associated noise, congestion, and emissions; these factors may influence their future use.

Among the most important secondary impacts would be accelerated land use changes in the surrounding area from low-density rural residential to more intense industrial, commercial and residential uses. These changes would be accelerated by increased highway and road access, additional water and sewer service, improved employment opportunities, and improved police and fire protection. Although this land use transitition is already in effect in the area, and will be increased by development of the I-435 corridor, location of the General Motors plant at 110th Street and State Avenue will both accelerate and alter the present situation for future growth.

The City of Kansas City has recently prepared a detailed land use analysis of the area west of the I-436 corridor and a review of the zoning controls which are necessary to assure existing property owners of an orderly transition from urban-rural fringe to a mixture of more intense uses. Appendix D contains the basic structural elements of the preliminary Master Plan. This Plan would affect future land use options for the area (see K.S.A. 12-704). In addition, the City will enact zoning ordinance amendments (see K.S.A. 12-707 et seq.) and other regulations to control land use. These tools will be used to regulate the intensity of future industrial/commercial development. Locating the GM plant at the 110th and State site represents a use allowed and planned for in the updated and revised plan prepared for the Planning Commission and City Commission. Implementation of this Master Plan will enable the City to control growth and attain a rational pattern of development and land use encompassing industrial, commercial and residential uses.

The land between the proposed GM plant and I-435 has good potential for development of industrial, industrial park and commercial uses. This transition would be influenced by locating the GM plant in this area; by the existence of officially approved planned industrial use west of I-435 between State Avenue and Parallel Parkway; by the provision of improved highway and road access in the area; by the outcome of zoning decisions on the area in question; and by the presence or absence of demand for these land uses.

Construction of the rail lead track could also influence the location of industrial uses in the area bordering the track from Parallel Parkway to just north of Leavenworth Road. Although the topography is somewhat

rolling, it is very little different than that of the proposed GM site and could be accessed by a rail spur from at least two points where the lead track is at or near grade. The land bordering the rail corridor generally north of Leavenworth Road exhibits steeper totpgraphy and is ill-suited for industrial, commercial or warehousing uses.

Less intensive industrial/office park uses may in time be located on land immediately surrounding the site. Again, the exercise of land use/zoning controls by the City and fluctuating market demand are key variables in determining the extent of these land use impacts.

Although indirect land use effects of the proposed plant site itself may extend slightly north of Leavenworth Road, impacts of the rail lead track are potentially the most noticeable of all project impacts in the study area, particularly on land abutting the rail right-of-way. Direct impacts of the rail track will be few since all rail/street intersections will be grade separated (with the exception of K-5), the track will be at least 600 feet from the nearest residential subdivision, and well over half the rail track will be contained in depressed sections and not visible to nearby land users. Consequently, rail related visual and aural impacts will be minimized.

Location of the rail track in the vicinity of old Piper, Countryview Lake Subdivision, and American Heritage Subdivision, may limit their future expansion to areas not directly abutting the rail tracks. However, if residential demand in this area rises, and the most readily available open space is developed, areas abutting the rail track will also develop if nationwide land use trends are used as standards to judge this particular situation.

Land along the principal traffic arteries, especially State Avenue and Parallel Parkway, may be converted to commercial/office uses consistent with the land use plan and zoning controls. This particular transition will likely occur first at key intersections. These uses may then expand areally to fill in the interstices, creating strip commercial areas similar to those found to the east along State Avenue; however, it is intended that strip commercial development be controlled via zoning and other City land use regulations. The City will control land use in the general study area through use of zoning powers and extension of City services; the proposed site is planned to be zoned "J-1" -- a Planned Industrial District.

Approximately 800 acres of land will be removed from agricultural production. At least 450 of these acres are classified as prime agricultural land, and the remainder is of statewide importance. The permanent removal of this land from agricultural production has been planned for many years by the City as evidenced in the 1973 report on the proposed I-435 corridor. Existing residential subdivisions began this process many years ago; the present project simply continues this transition. Wyandotte County is an urban county in a large standard metropolitan area. The transition of agricultural land to non-agricultural purposes is a normal element in the development of cities in urban counties. Consequently, the permanent loss of these acres does not significantly affect local, regional, or state agricultural productivity.

In addition, this land would be converted to intense economic uses of such a magnitude that both the short- and long-term productivity of the project far outweigh the losses associated with decreased agricultural acreage.

6.3.2 Open Space, Recreation, and Institutional Facilities

Implementation of the proposed action would not directly or adversely impact lands currently in open space, recreation, or institutional zoning districts. However, the Comprehensive Plan for the annexed areas in the I-435 corridor adopted by the City Planning Commission in January, 1973, shows several portions of the site in open space and recreation uses. The preliminary updated plan would preempt these uses.

Impacts on existing areas in open space, recreation, and institutional uses would not be significant as these facilities are at some distance north and west of the site.

6.3.3 Housing

The proposed move of the General Motors plant to the Port Authority site may affect the value and continued development of housing in the Piper Area. Other impacts will be associated with the railroad lead track and related development.

Of existing residential developments, only Delaware Acres, just south of the proposed site, will be directly affected by the plant. The primary influence on Delaware Acres will be at the northern end of the development where it abuts State Avenue, very near the main entrances to the General Motors plant. Street patterns in the subdivision suggest that further development is intended to go south, east and west. This may eventually occur, even with the proposed action, but the general value and density of new housing may change. Additional housing may include low-density multi-family dwellings. An increased demand for prefabricated homes and mobile home parks may also occur; the updated land use plan recently prepared by the City assesses this possibility and proposes appropriate controls. Although increased traffic along State Avenue, especially at shift changes, will affect Delaware Acres somewhat, the most significant impacts are expected to come from increased commercial development along State Avenue. The main effects of these changes in traffic and land use on housing values in Delaware Acres may be to slow the rate of appreciation. However, possible impacts on this will be mixed. The proximity of commercial development may be expected to make the area more attractive although the plant itself and associated traffic may cause negative impacts. These impacts are expected to be as much psychological as real because Delaware Acres is fairly well shielded from State Avenue even now, and the proposed plant will sit well north of the street.

Rail Lead Track

The following table shows the approximate distance in feet and miles from each housing development and the proposed rail lead track.

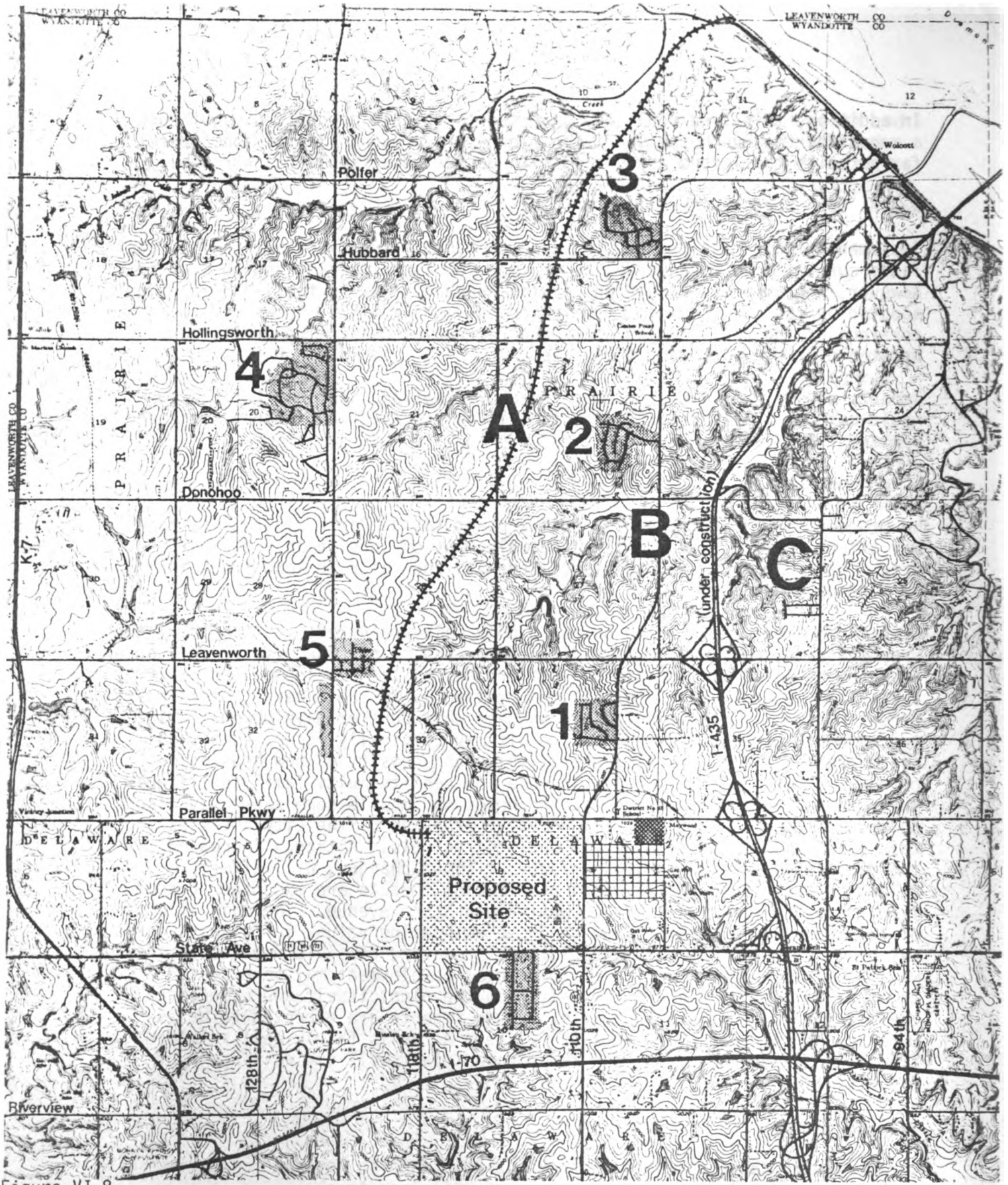


Figure VI-8

KEY RESIDENTIAL AREAS

1 Homestead
2 American Heritage
3 Countryview
4 Prarie Oaks/Leiker Gardens
5 Old Piper
6 Delaware Acres

0 2000 4000 6000 8000 10000ft

TABLE VI-12

APPROXIMATE DISTANCE FROM NEAREST POINT OF EACH HOUSING AREA TO PROPOSED RAIL ROUTE

Housing Area	Distance in feet	Distance in miles
1. Homestead	5,680	1.08
2. American Heritage	1,400	.27
3. Countryview	600	.11
4. Prairie Oaks/Leiker Gardens	4,280	.81
5. Old Piper	400	.08
6. Delaware Acres	4,800	.91
7. Rural	varies	---
Average Distance	2,827	.54

SOURCE: PGAV/Community Resource Corporation - November, 1980.

The effects of noise produced by a rail line are, of course, a function of distance. The further away the rail line is from a development, the less the effects on value and the quality of life. At some point these effects for all practical purpose, become zero (noise impacts are addressed in section 6.2.7). With the proposed rail route, all noise effects are most likely negligible.

An additional unquantifiable effect is basically phychological. Although the noise produced is not significant for sensitive receptors at most points along the right-of-way, the rail line would, in fact, lie close to a number of houses on both the Countryview Subdivision and Old Piper. The proximity of the railroad alone may have some deleterious effects on housing values in both areas, and may limit additional development in tracts abutting the rail line, especially in Countryview and American Heritage.

Because of the proximity of the rail line to these housing developments future rates of appreciation may be somewhat lower in the short-term but should equal typical rates of appreciation soon after construction of the plant and rail line are completed. Most likely, not all of the seven existing developments would be affected equally. Old Piper and Countryview may be most impacted, while Prairie Oaks and Delaware Acres will probably not be directly affected. The first two housing areas will be screened from potential adverse impacts of the railroad by the fact the track will be depressed 40 feet and 70 feet(respectively) below grade, thus mitigating the possible effects somewhat.

6.3.4 Population

According to 1980 U.S. Bureau of the Census counts, the Piper area (which essentially includes Census Tracts 447.01, 448.01 and 448.02) currently has a resident population of 6,915. This same area, in 1970, had a population of 5,004, which represents an increase of 38.2 percent for the ten-year period. Figure VI-9 illustrates the boundaries of the three tracts and the location of the rail line being examined. Table VI-13 lists population by census tract for both 1970 and 1980, percentage changes, average annual percentage change, and population projections for 1990.

Census Tract 447.01 lies completely inside the City limits. From 1970 to 1980, this area grew by 39 percent or an average annual rate of 3.9 percent. The rail lead track would lie in only a very small portion of this census tract. Interstate 435, however, bisects the tract from north to south. A portion of the resulting corridor between I-435 and the rail spur may develop in industrial, commercial, and some medium density, multi-family residential uses. The City has a preliminary, updated land use plan which considers the effects of the proposed action. The approximate acreages dedicated to each of these uses will be determined as a result of that plan (see Appendix D). For purposes of this EIS, however, some estimate of population must be made. Because the rail may encourage industrial development, Census Tract 447.01 is not expected to experience heavy population growth, and what growth does occur will most likely be east of I-435. The 39 percent rate of increase is assumed to continue from 1980 to 1990 and result in a population of approximately 3,000.

Census Tract 448.01 lies in the far northwest corner of Wyandotte County. Roughly one-third of its area is within the City limits. All of the subdivisions in the Piper area, with the exception of Homestead and Delaware Acres, are in this tract. In 1970, the population of this area was 1,522. By 1980, Census Tract 448.01 had experienced rapid growth; its population is currently 2,503, representing an increase of 64.5 percent. Because housing development has lessened in the past several years, the rate of growth experienced between 1970 and 1980 is very unlikely to continue. An estimated growth rate for the next 10 years of 32.0 percent (or about one-half the last dicennial rate) was used. An increase of 32.0 percent would result in a 1990 population of 3,300. More significant, however, than the increase in population is the anticipated distribution of that population. New residential development may not locate near the rail line but may occur in the northwest corner of the County, at the edge of present City limits.

Census Tract 448.02 lies entirely outside Kansas City, Kansas, City limits in the extreme southwest corner of Wyandotte County. Although the majority of this census tract was not included in the study area, a certain amount of population growth due to the proposed action could reasonably be expected to occur in the future along the I-435 corridor and around the General Motors site. An increase of 50 percent over the ten-year period is probable based on recent population trends in the Piper Area. The 1990 population of Census Tract 448.02 would then be 3,375.

Under these growth rate assumptions, then, the 1990 population of the total Piper area would be 9,675, the rate of increase from 1980 to 1990 would be 39.9 percent.

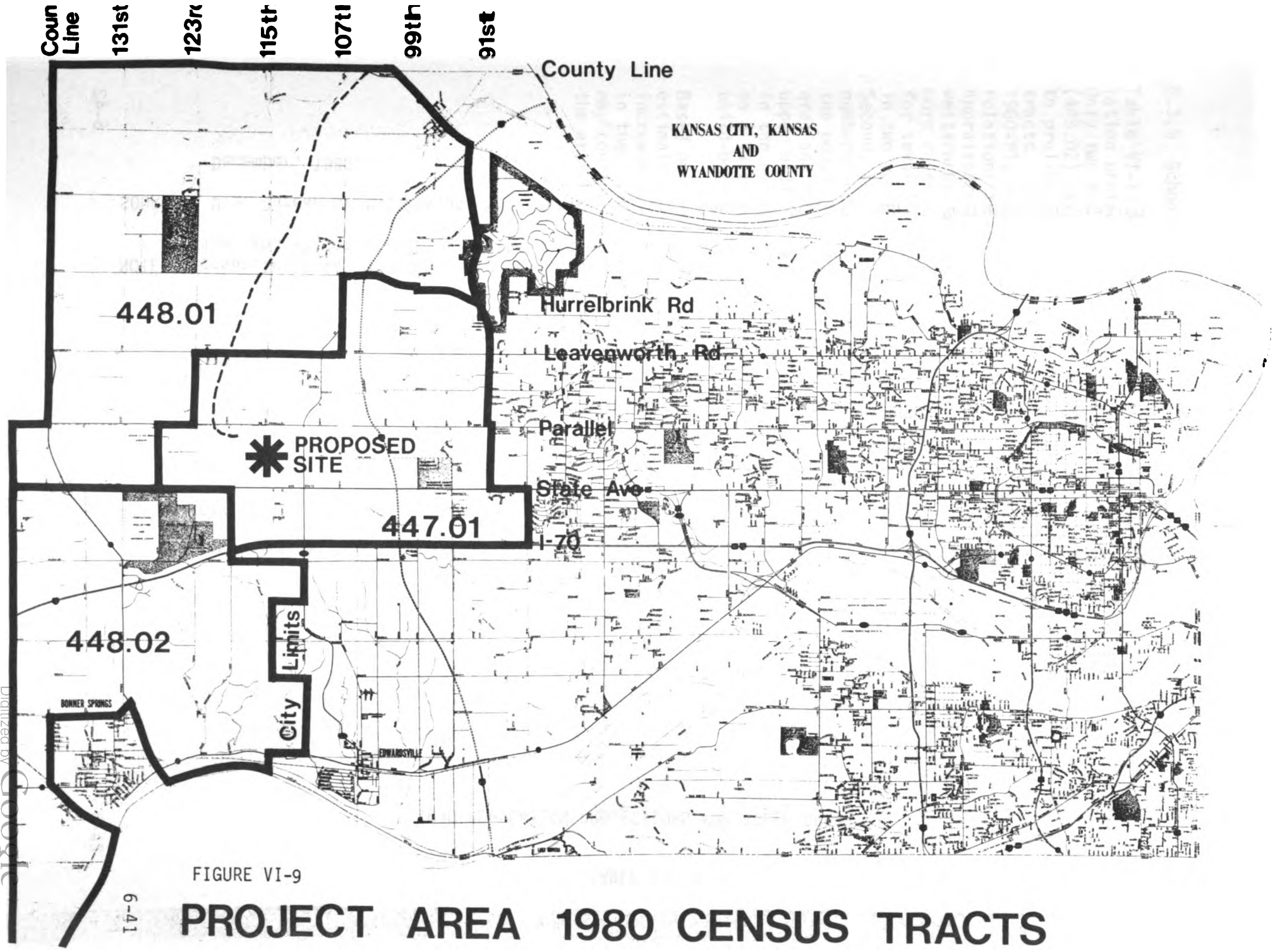


FIGURE VI-9

PROJECT AREA 1980 CENSUS TRACTS

TABLE VI-13

1990 POPULATION PROJECTIONS FOR PIPER AREA

Census Tracts	Population 1970	Population 1980	Percentage Change Total	Percentage Change Average Annual	Growth Rate Assumption	1990 Projection
447.01	1,555	2,161	39.0	3.9	39%	3,000
448.01	1,522	2,503	64.5	6.4	32%	3,300
448.02	1,927	2,251	16.8	1.7	50%	3,375
TOTAL	5,004	6,915	38.2	3.8	39.9%	9,675

NOTE: Census Tract 447.01 lies inside the City limits; about one-third of 448.01 is inside the City; and all of 448.02 is in the unincorporated portion of Wyandotte County.

SOURCE: U.S. Bureau of the Census; Mid-America Regional Council; PGAV/Community Resource Corporation. December, 1980.

6.3.5 Schools

Table VI-13 in the preceeding section on Population (6.3.4) gives 1990 population projections for the three census tracts in the general study area. Only two tracts (447.01 and 448.01) are used in this section because the third (448.02) is, for all practical purposes, not in the Piper USD #203. According to preliminary 1980 Census tabulations, there are 4,664 residents in the two tracts. Total enrollment in the Piper school system is 851 for academic year 1980-81, which represents 18.2 percent of the population. (In 1970, the same relationship was 17.8 percent.) According to the 1978 Wyandotte County Appraiser's Census, 25.9 percent of the population of a larger portion of western Wyandotte County was 18 years old or younger. The average of the two more recent proportions--22.1 percent--is used to project school enrollments for several reasons. First, a difference of nearly eight percentage points in two years is somewhat unreasonable, barring some cataclysmic event. Second, the percentages for 1970 and 1980 indicate a trend of increasing numbers and proportions of the school-aged population, contrary to trends in the population in general. In addition, the population that now lives in the area and the mix that can be expected is basically young and middle - to upper middle-income. Growth in the next ten years will most likely continue in the same pattern. Multi-family units will draw young marrieds to the area, so a large portion of the population is now and will continue to be in its child-bearing years.

Based on these assumptions, Piper USD #203 can expect the conservative estimate of enrollment for 1990 shown on Table VI-14. The annual average increase in Piper enrollments from 1970 to 1980 was just under six percent. In the last year, the actual change has been small and negative. These trends may continue for a year or two, but once I-435 is completed and development in the area begins, the change can be expected to be relatively rapid.

TABLE VI-14

HISTORIC AND PROJECTED CHANGES IN PIPER USD #203 ENROLLMENTS

Academic Year	Total Enrollment	Percentage Change From Previous Year	Percentage Change From 1970
1970-71	539		
1971-72	588	9.1	9.1
1972-73	679	15.5	26.0
1973-74	763	12.4	41.6
1974-75	804	5.4	49.2
1975-76	809	.6	50.1
1976-77	809	-0-	50.1
1977-78	812	.4	50.6
1978-79	855	5.3	58.6
1979-80	874	2.2	62.2
1980-81	851	-2.6	57.9
1990 Projection[1]			Change From 1980
	1,392		63.6

(1) Based on 22.1 percent of projected population and represents all population 18 years old and under.

SOURCE: Enrollment data from Piper USD #203; projections by PGAV/Community Resource Corporation, December, 1980.

6.3.6 Commercial Activity and Employment

A. Commercial Activity

Development of Commercial centers in the Piper area is a certainty. Interstate 435 will cause this section of the City and County to develop much more rapidly than at present; considerable commercial growth was planned for as early as 1973 in the City's Comprehensive Land Use Plan for I-435. Suburban communities usually have such activity at most or all major intersections, and the study area should not deviate from that pattern. However, General Motors and the railroad spur may change the scenario somewhat. Estimates of the size of commercial development and the locations are given in the updated land use plan. This information appears in Appendix D. Commercial uses (as all other uses) will be regulated by zoning ordinances enacted as a result of above mentioned studies made by the City.

Industry-specific employment and income multipliers for the Kansas City Standard Metropolitan Statistical Area have been recently developed by the Kansas City, Missouri, City Development Department. Retail produces little additional employment, generating far less than one additional job for each retail employee. These impacts should be fairly localized. The multipliers for retail activity are given below.

Type of Activity	Employment	Income
Eating and Drinking Establishments	1.020740	2.2014106
Other Retail	1.067083	1.6117338

B. Employment

Primary employment impacts will come from the construction phase in the short run and from General Motors itself in the long run. Short-range secondary impacts will come from construction support activities and other jobs created throughout the SMSA economy due to increased construction employment. Long-range impacts of General Motors' operational phase will have a more significant impact on the local economy because more people will be employed for longer periods.

B.1 Short-Range Impacts: Construction Phase (1981-1983)

The U.S. Department of Labor and a large, established local contractor provided estimates of the number of jobs created by a project the size of the proposed General Motors Plant. An average of 625 direct construction jobs per year was estimated with a peak employment of 2,000 occurring sometime during the two-year construction phase. The final multiplier for contract construction is 2.043618 and means that, for every construction job that occurs, 1.043618 additional jobs are created throughout the local economy. These include support personnel for the actual construction as well as

grocery clerks, gas station attendants and other tertiary sector employees required to support this increase in economic activity. However, no accurate way exists to determine how many of those jobs will go to Wyandotte County residents, so construction impacts discussed herein apply to the metropolitan economy as a whole.

Table VI-15 shows the estimated short-range impacts of the construction phase both in terms of employment and income. Note that employment increases are one-time impacts and would not repeat in the second year, but rather would continue throughout the two-year construction period. Income impacts, however, will repeat annually until the plant is completed. The income impacts will have the biggest effect where the paychecks are spent, that is, at the worker's place of residence. In this case, these impacts will be distributed throughout the SMSA economy. No estimate of the specific resident employment or income impacts on Wyandotte County or Kansas City, Kansas, is possible until a construction crew is actually hired.

TABLE VI-15

CONSTRUCTION PHASE IMPACTS (1981-1983) ON THE KANSAS CITY, MISSOURI-KANSAS, SMSA ECONOMY

	New Jobs Created	Peak	Average Annual Income	Total Annual Income	Peak Employment Income
Construction	625	2,000	$27,450[1]	$17,156,250	$54,900,000
Multipliers	1.043618		1.257107		
Secondary Impacts	653	1,044	34,508	21,567,242	34,507,587
TOTAL	1,278	3,044	$61,958	$38,723,492	$89,407,587

[1] Average cash wages were estimated at $13.00 per hour. An additional $2.25 in contributions to health and welfare and pension funds is paid. Average annual hours in the Kansas City construction industry is 1,800, so an annual income of $27,450 is estimated.

SOURCE: Kansas City Construction Coordinating Committee; J. E. Dunn Construction Company; Kansas City, Missouri, City Development Department; PGAV/Community Resource Corporation, December, 1980.

Additional impacts would accrue to the SMSA through construction of the rail spur and those public improvements associated with the project. These were not included in the estimates. Also, any other construction activity in the area will have similar positive impacts on the regional economy.

B.2 Long-Range Impacts: Operational Phase (1983-)

For purposes of defining long-range impacts of the proposed action, only the incremental increase in employment was considered. Because the Fairfax Plant already exists and has been in operation for a number of years, impacts of the old plant were long ago created and distributed throughout the SMSA economy. Therefore, impacts of the proposed new plant on the economy would come only from additional employment and income created by expanded operations at the Port Authority site. General Motors provided data recorded in February, 1980, on all employees on file at that time. These data, which distributed employees by zip code, indicated that 25.092 percent of all General Motors Fairfax employees live in Wyandotte County. This percentage is assumed for the new plant as well, allowing a geographic distribution of the expected employment and income impacts. Table VI-16 shows the differences between projected peak employment at the proposed plant and the March, 1980, peak and current employment at Fairfax. March, 1980, was chosen because that was the most recent period of two-shift production; the first of two layoffs occurred in April, 1980.

The row "Additional General Motors Jobs" in Table VI-16 is the difference between the 6,000 employees General Motors projects for full production levels at the Port Authority site and the various levels of employment at Fairfax over the last year. "Additional Wyandotte County Jobs at General Motors" is the estimated portion of those employees who will live in Wyandotte County. It is these employees who will have the greatest economic impacts on the County and City.

The SMSA employment multiplier for motor vehicle manufacturing is 1.914401. That is, for every General Motors job that is filled by a Wyandotte County resident, nearly two more jobs are created in the County. The total additional jobs, both direct and indirect, would range from 513 to nearly 2,500.

TABLE VI-16

OPERATIONAL PHASE EMPLOYMENT IMPACTS (1983-) ON THE WYANDOTTE COUNTY ECONOMY

	3/80-Avg. Employment	2/80-Peak Employment	11/80-Current Employment
Port Authority Site	6,000	6,000	6,000
Fairfax Employment	4,700	5,300	2,600
Additional General Motors Jobs	1,300	700	3,400
Proportion Wyandotte County Residents	25.092%	25.092%	25.092%
Additional Wyandotte County Jobs at GM	326	176	853
Multiplier		1.914401	
Additional Jobs Due to Increase at GM (Secondary Impacts)	624	337	1,633
Total Increase in Jobs for Wyandotte County Residents (Total Impacts)	950	513	2,486

SOURCE: General Motors Corporation; Kansas City, Missouri, City Development Department; PGAV/Community Resource Corporation; December, 1980.

Income generated by increased employment at the proposed site is shown in Table VI-17. An average annual income was calculated based on average hourly production wages and benefits and average annual hours supplied by General Motors and effective in November, 1980. Both money wages and paid benefits were included as any determination of income should include such benefits. The reasoning is that even though the employee never sees these monies, they are spent in his behalf and cycle through the economy because of him. Average cash wages for a General Motors Fairfax production employee are $10.68 per hour with an additional $6.38 an hour in paid benefits. The total hourly income, then, is $17.06 and the average annual number of hours worked is 1,800, yielding an average annual income in wages and benefits of $30,708.

TABLE VI-17

OPERATIONAL PHASE INCOME IMPACTS (1983-)
ON THE WYANDOTTE COUNTY ECONOMY
(1980 DOLLARS)

	3/80 Average	2/80 Peak	11/80 Current
Additional GM Jobs in Wyandotte County	326	176	853
Average Annual Wage [1]		$30,708	
Total Increase in GM payroll distributed to Wyandotte County	$10,010,808	$5,404,608	$26,193,924
Multiplier		2.1728808	
Secondary Income Impacts to Wyandotte County	$21,752,293	$11,743,569	$56,916,275
Total Income Impacts to Wyandotte County	$31,763,101	$17,148,177	$83,110,199

[1] Average production wage was supplied by General Motors. In money wages, it is $10.68 per hour with an additional $6.38 per hour in benefits paid. The total hourly wage, then, is $17.06. Average annual hours worked is 1,800, according to General Motors, yielding an average annual income of $30,708 in cash and benefits.

SOURCE: General Motors Corporation; Kansas City, Missouri, City Development Department; PGAV/Community Resource Corporation; December, 1980.

This income was multiplied by the number of additional Wyandotte County residents expected to work at the new plant. The income multiplier for motor vehicle manufacturing is 2.1728808 for a total income impact ranging from $17 million to $83 million. Unlike employment impacts, these will repeat for every year of operation. The magnitude, however, is a direct function of the number of Wyandotte County resident employees, average income levels, and the multiplier, which can also change if economic relationships in the SMSA change. It should be noted that these impacts must be considered as ranges and orders of magnitude, not absolute values. They are based on peak production at the proposed new plant and do not consider fluctuations in employment.

6.3.7 Economic Factors

The City has prepared a memorandum assessing the fiscal impacts of the proposed new plant. That document, entitled Fiscal Impacts to Kansas City, Kansas, of Administrative Charge to General Motors, February 25, 1981, is included in Appendix E of this EIS.

6.4 IMPACTS ON HISTORIC AND CULTURAL ELEMENTS

6.4.1 Historic Elements

The Federal Register listings of the National Register of Historic Places contained in the Annual Update for 1980 reveal that no National Register sites are in proximity to the proposed plant location or the rail route. The Kansas State Historic Preservation Officer has confirmed this finding.

6.4.2 Archaeological Sites

The Kansas State Historic Preservation Officer was contacted and stated that no archaeological sites have been recorded in this area. In addition, because previous and current agricultural practices have not uncovered any significant historical artifacts, it is unlikely archaeological materials are on the site (see Appendix F).

If during the course of construction evidence of deposits of historical or archaeological interest is found, the contractor shall cease operations affecting the find and shall notify the owner who shall notify the Executive Director, Kansas Historical Society, 120 West 10th Street, Topeka, Kansas 66612. No further disturbance of the deposits shall ensue until the contractor has been notified by the owner that he may proceed. The owner will issue a Notice to Proceed only after the State official has surveyed the find and made a determination of value and effect and submitted such determination to the owner.

6.4.3 Quality of Life

Changes to the site and adjacent land brought about by implementation of the proposed action will be significant factors affecting the quality of life in the general study area. These changes will be most significant on and in the vicinity of the site and around the rail tracks and will decrease with distance from the new plant and tracks. Visual, aural and aesthetic qualities

will be negatively impacted by alteration of the topography, land use, and traffic patterns.

The loss of rural ambiance will occur very quickly at the proposed site and less rapidly in the general study area. This transition would occur if the I-435 corridor were to be developed without relocation of the GM plant, but the plant and associated facilities will accelerate these changes considerably.

Specific elements which will affect the quality of life include conversion of agricultural land to industrial and commercial uses, increased noise, paving large land areas on the plant and truck/rail yard sites, alteration of existing traffic patterns, lighting of the site at night, construction and use of a railroad line to the site, and more intense use of nearby lands.

6.5 IMPACTS ON UTILITIES AND SERVICES

6.5.1 Energy Requirements

A. Electrical Power Service

The proximity of the Maywood Substation to the site (approximately 1.5 miles east) would allow the Board of Public Utilities to supply the proposed plant with two standard service 161 kv lines with no adverse impacts to the system. This would provide sufficient capacity to the plant which would require 45,000 KVA at full production and a projected 168 million killowatt-hours per year. Additional right-of-way acquisition will be necessary to accomplish this service extension.

B. Natural Gas Service

General Motors estimates that the proposed plant would require the following volumes of natural gas:

Time Period	MCF
Peak Hour	238
Peak Day	2,821
Minimum Year	561,000
Maximum Year	967,000

This demand would be served by private enterprise pipeline companies with facilities in the area. The wholesale supplier to the area, Cities Service Gas Company, maintains 400 psi in a 26 inch-pipeline located approximately four miles north of the site. Service to the plant would probably be supplied by Union Gas System, Inc. the retail distributor with the closest facilities to the site. This distributor has indicated that it has more than adequate capacity to meet this requirement. Thus, there would be no adverse impacts on either the wholesale or retail natural gas distribution system.

C. Coal Supply

At the current plant in Fairfax, steam supply needed in the manufacturing process is produced by burning oil and gas, but the proposed plant will include facilities for generating the steam required by burning coal. General Motors estimates that on the average it will require approximately 200 tons of coal per day. The company has not made arrangements with a supplier at this early date; however, according to the best available estimates of supply, the availability of coal in the area is adequate to meet this need. Consequently, no adverse impacts to this energy supply would be expected to occur with implementation of the proposed action.

6.5.2 Solid Waste Disposal

Operation of the proposed new plant would require little, if any, change in General Motors solid waste disposal requirements. Assuming that the Fairfax plant would cease operation upon opening of the new plant, the net change in the volume of solid waste/production shift to be disposed would be minimal. Any change would result from increased production at the new plant. Thus the solid waste disposal impacts would be minimal. All solid wastes will be disposed of at state-approved sanitary land fills.

6.5.3 Water Supply

The proposed plant would require an estimated 2 mgd at peak demand. Peak demand for production water would be 2,000 gallons/minute and maximum fire protection flow required would be 4,000 gallons/minute. To be assured this level of service, General Motors estimates that it would need a guaranteed 50 psi minimum pressure at its on-site meter.

With a current excess capacity of 7.5 mgd over peak demand at the 12th Street plant on the Missouri River, and a 36-inch diameter water main terminating at the northeast corner of the site, the BPU has more than adequate capacity in its system to serve General Motor's water needs.

6.5.4 Sanitary Sewerage

As proposed by General Motors, the new plant would require a maximum sewage transport and treatment capacity of 1.5 mgd. This requirement would be served by the City's Little Turkey Creek Interceptor (currently in the design stage) and WWTP #20 (in operation since Spring, 1980). According to the City's Water Pollution Control Department (WPCD), the maximum design capacity of the branch of the LTC Interceptor which would serve General Motors is 6.37 cfs, which would be more than adequate to meet the 4.73 cfs requirement of the proposed plant. Also, according to the WPCD, the normal capacity of WWTP #20 is 7 mgd with a current demand of 2.3 mgd. Thus, the excess capacity of 4.7 mgd is more than adequate to serve the proposed plant. The Supplemental Wastewater Treatment Facility Plan - Little Turkey Creek, 1980, is included in this document by reference.

At the November 20, 1980, Scoping Conference, representatives of the EPA requested that alternatives to the proposed wastewater conveyance system

and treatment method be evaluated in the EIS. Subsequent discussions with EPA officials led to identification of several possible alternatives. These alternatives are listed below.

Construct a separate interceptor from the plant to WWTP #20.

Construct a separate treatment plant at Wolcott Bottoms on the Missouri River, along with a connecting interceptor.

Construct a separate treatment plant on the Kansas River, along with a connecting interceptor.

Construct a separate treatment plant which would discharge into one of the streams in the area, along with a connecting interceptor.

Construct a no-discharge treatment plant.

These alternatives were discussed with the Director of the City's WPCD. It was determined that none are viable because the additional expense would prevent General Motors from locating at the proposed site regardless of which party--General Motors or the City--would be responsible for the cost. Consequently, these alternatives are not considered further.

6.5.5 Police, Fire, and Emergency Service

Assistance by local law enforcement agencies would be required only in actual arrest situations or for major emergencies. General Motors would provide personnel and equipment for general plant security.

Similarly, an internal fire protection force would be maintained by General Motors to handle most situations. If the plant is approved, the City plans to build a new fire station on Parallel Parkway approximately 500 feet east of 110th Street. This station would house a 1,500 gpm pumper and a 100-foot aerial device truck. With an average response time of less than two minutes to the plant, this station would provide adequate initial fire emergency response.

The proposed plant would also include an infirmary to treat minor illnesses and injuries at the plant. Emergency health situations services would be adequately served by the KARE Service vehicles operating out of Providence Hospital at 90th Street and Parallel Parkway. In general, therefore, impacts on emergency services would be slight.

6.5.6 Telephone Service

There would be no adverse impacts to Southwestern Bell's telephone network. The toll switching office in Kansas City, Missouri, has excess capacity adequate to serve the needs of the proposed plant, and its Bonner North central office already provides service to the general area which includes the site.

6.6 TRANSPORTATION IMPACTS

6.6.1 Traffic Growth Without the Proposed GM Plant

The 1990 forecast traffic volumes without the presence of the proposed General Motors plant are illustrated in Figure VI-10. This forecast was prepared from a synthesis of information including the MARC year 1987 and 2000 traffic assignments and historical traffic growth rate information on arterial and collector streets. A straight line increase of seven percent traffic growth per year was used on arterials and collectors, and an 8.5 percent per year straight line increase for I-70. These rates, together with pattern information from the assignment software output, reveal the following general growth behavior:

1. Evidence of residential and commercial expansion westward into Wyandotte County as less dense agricultural land is absorbed over the next decade, and

2. Impacts of construction of the I-435 corridor south from the Missouri River, aiding in the opening of agricultural land to other uses; providing efficient KCI Airport access; and access to other commercial centers in northern and eastern Kansas City, Missouri, from this eastern portion of the region.

6.6.2 Traffic Impacts of Implementation

The proposed GM plant and truck/rail yard will be constructed on approximately 700 acres at the location shown in Figure VI-11. The plant is designed to employ a maximum of 6,000 people and includes 3,500 employee parking spaces and a finished product parking area for 4,300 cars. As stated previously, site access includes a Missouri Pacific Railroad corridor with two pure grade crossing separations at 118th and 110th Streets. Under current plans, 70 percent of all finished products will be shipped by rail and 30 percent by truck. However, these ratios are likely to be highly flexible in the future, depending on size of car produced, length of finished product haul, general economic conditions of the nation, and likely rail/truck rate competiveness. At present, only two working shifts are contemplated, with a relatively small third shift composed of maintenance employees only. Should consumer demand flourish, each of the two production shifts will be lengthened to ten hours each, operating from 5:00 a.m. to 3:00 p.m. and 3:30 p.m. to 1:30 a.m. Analysis of the traffic conditions associated with implementation of the proposed action was undertaken for two different situations, the first a "worst case" scenario of operations and the second an ambient or "typical" level of plant operations expected by General Motors.

To adequately test the "worst case" traffic impact of the plant activities, maximum trip generation was developed for the lengthened two 10-hour shift operation, with adequate inclusion of significantly larger truck delivery operations and a very high level of random non-employee-related, off-peak plant visitations (mechanics and office equipment repairmen, site tours, governmental visits, etc.). This "worst case" maximum trip generation,

Figure VI-10

KANSAS CITY, KANSAS
1990 FORECAST TRAFFIC GROWTH
WITHOUT G.M.

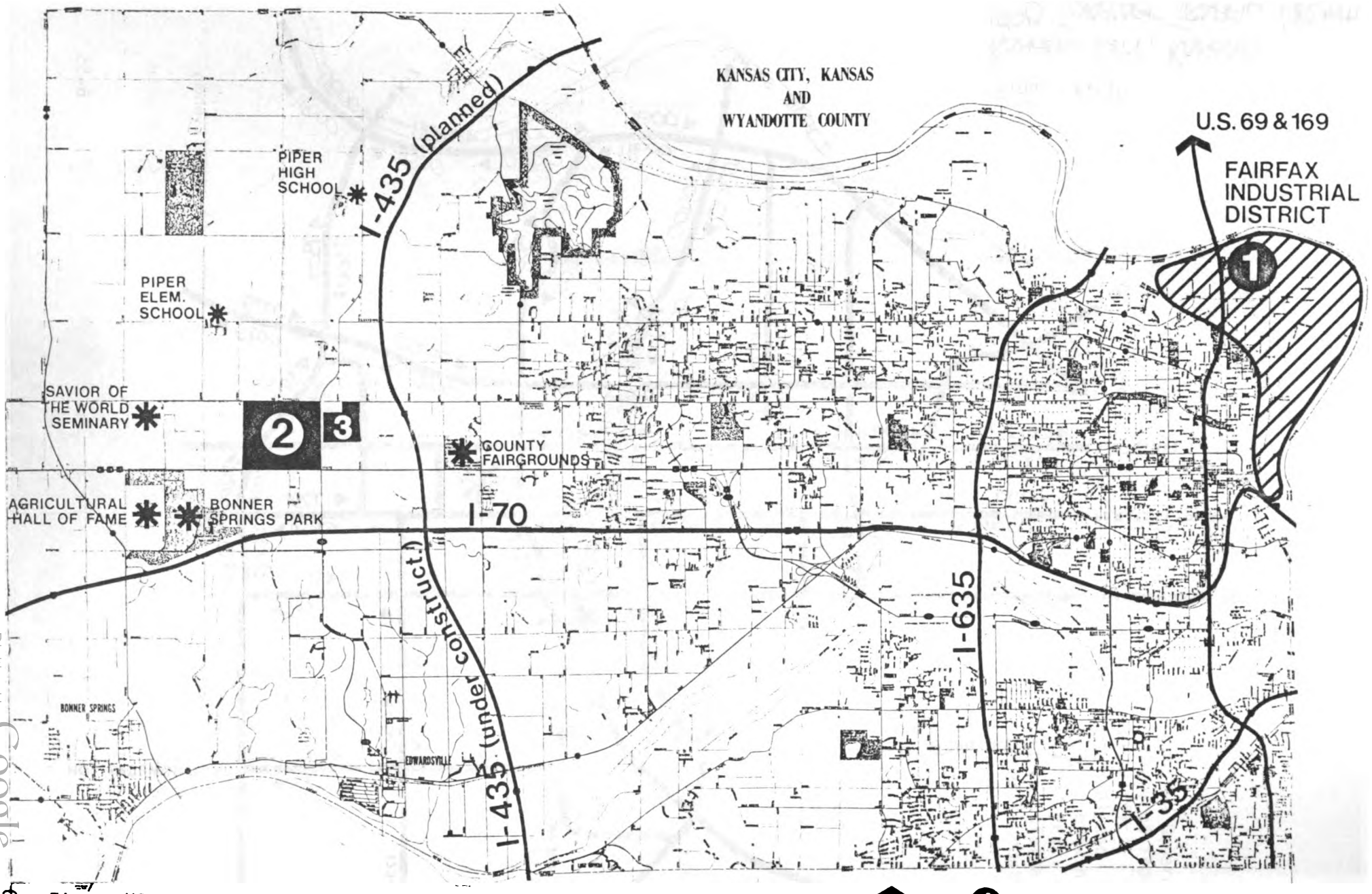


Figure VI-11

Site Location Map

1 Existing General Motors Facility
2 Proposed New GM Location

articulated in Table VI-18, results in an ultimate trip generation of 14,500 one-way trips to be accounted for, or a typical regional ADT increase of 29,000 to be accommodated by the highway system due to the presence of the proposed plant.

TABLE VI-18

MAXIMUM TRIP GENERATION - "WORST CASE CONDITIONS"

TWO SHIFTS WITH OVERTIME

Shift 1

5 a.m. - 3 p.m.

2,700 Hourly		
457 Salary		
3,157 Total Employees x 3 trips/employee =		9,471

Shift 2

3:30 p.m. - 1:30 a.m.

2,482 Hourly		
191 Salary		
2,673 Total Employees x 1.75 trips/employee =		4,678

Shift 3

11 p.m. - 7:30 a.m.

144 Hourly		
26 Salary		
170 Total Employees x 1 trip/employee =		170
Truck Haulage		175
		14,494
Call Trips Generated		14,500

Using manual micro-assignment techniques and highway capacity relationships, the above worst case ADT impacts are estimated to fuse with the normal regional growth of Figure VI-10 and load as shown in accompanying Figure VI-12. Preparation of the assignment pattern was facilitated by analysis of a compass rose of projected employee origin-destination (O-D) distributions provided by the General Motors Corporation Real Estate Division. The metropolitan region origin-destination to the relocated plant will be as follows:

Compass Point	Percent of Work Force
NNE	8.6%
ENE	27.6%
ESE	45.7%
SSE	12.3%
SSW	1.7%
WSW	1.7%
WNW	.4%
NNW	2.0%

As can readily be seen from review of the compass points and loadings in Figure VI-12, the majority of employees will access the plant by using I-70 west to I-435 north. A significant number will also access the area by using I-435 directly from the north and south.

The immediate plant access is as illustrated in Figure VI-13 with loadings and turning movements as shown. All intersections will be signalized, and the intersections at the three gate openings on State Avenue may have to be progressively interconnected.

Based on conventional capacity analysis criteria for 4- and 6-lane freeways, one- and two-lane ramps, and signalized intersections, the quality of traffic flow is manageable, as shown in Table VI-19.

As illustrated in Figure VI-14, all segments of the freeway would operate at adequate levels of service, with the exception of a variable level of service between C and D on I-435 between I-70 and Parallel Parkway due to the ultimate design and use pattern of weaving sections relating to the three complex interchanges in the vicinity. Critical plant shift change movements will be higher than normal regional commuter peak hour movements at only two locations (shown by solid box at Ramp A for plant ingress movement, and dashed box at Ramp D for plant egress movement.) Loop Ramp A will exhibit congestion, operating at level D, during the lengthened 10 hour first shift in-bound movement (4-5 a.m.) under these assumptions. Directional ramp set D due to its length and lane balance will operate adequately at Level of Service C, as will ramp set E. Loop ramps B and C will also operate at adequate levels of

Figure VI-12

1990 TRAFFIC ASSIGNMENT INCORPORATING THE PRESENCE OF THE GM ASSEMBLY PLANT WORST CASE CONDITION MAXIMUM TRIP GENERATION TWO SHIFTS WITH OVERTIME

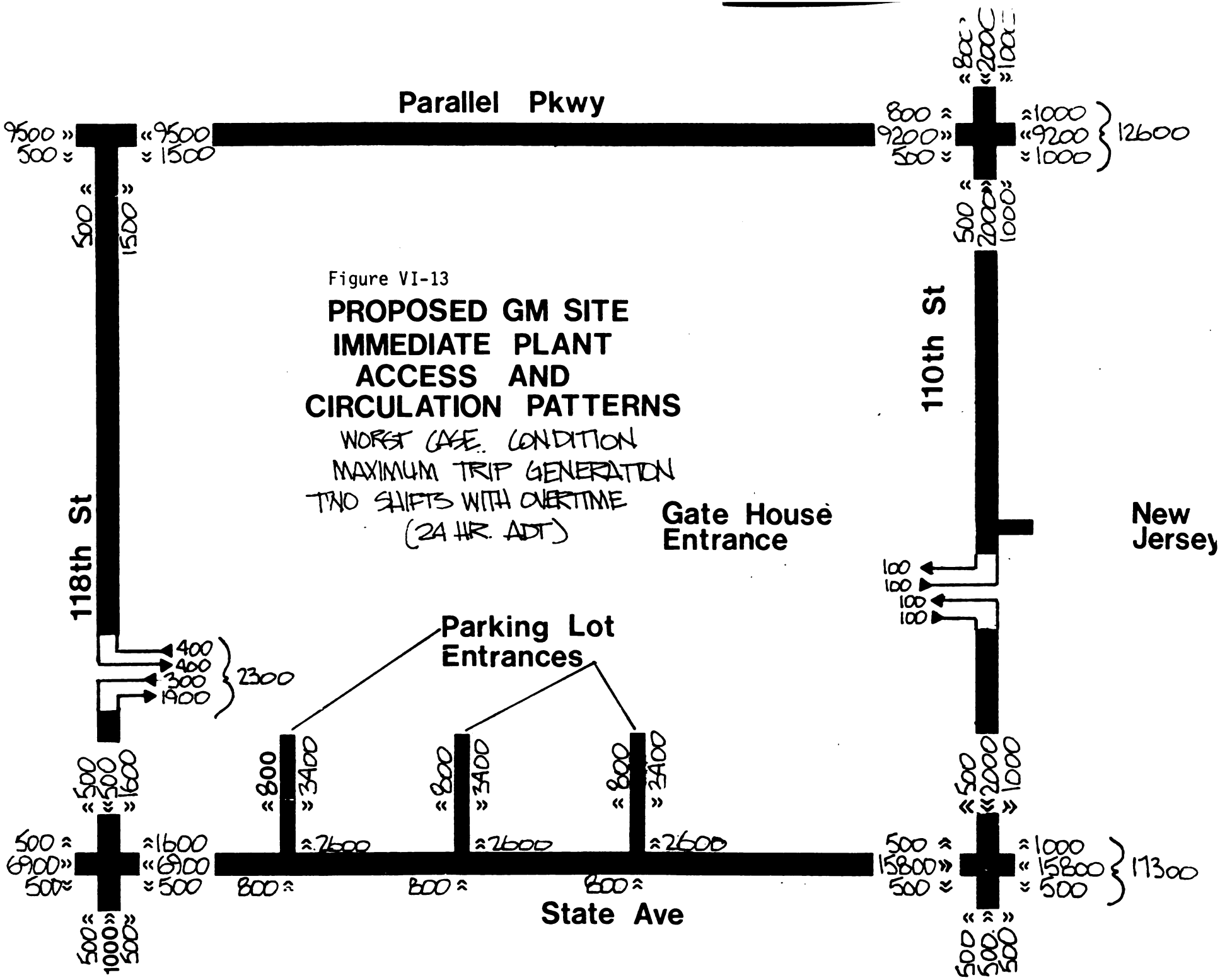


Figure VI-13

PROPOSED GM SITE IMMEDIATE PLANT ACCESS AND CIRCULATION PATTERNS

WORST CASE CONDITION
MAXIMUM TRIP GENERATION
TWO SHIFTS WITH OVERTIME
(24 HR. ADT)

TABLE VI-19

QUALITY OF TRAFFIC FLOW - WORST CASE

Segment	Level of Service (LOS)
I-70 West of I-435, EB	A-B
I-70 East of I-435, WB	A-B
I-435 South of I-70, NB	A-B
I-435 North of Leavenworth Road, SB	A-B
I-435 North of I-70 and South of Parallel Parkway	C-D Variable due to Weaving
Critical Ramps	
Loop Ramp A	D
Loop Ramp B	A-B
Loop Ramp C	A-B
Ramp D	C
Ramp E	C

SOURCE: Civic Systems Inc.; March, 1981.

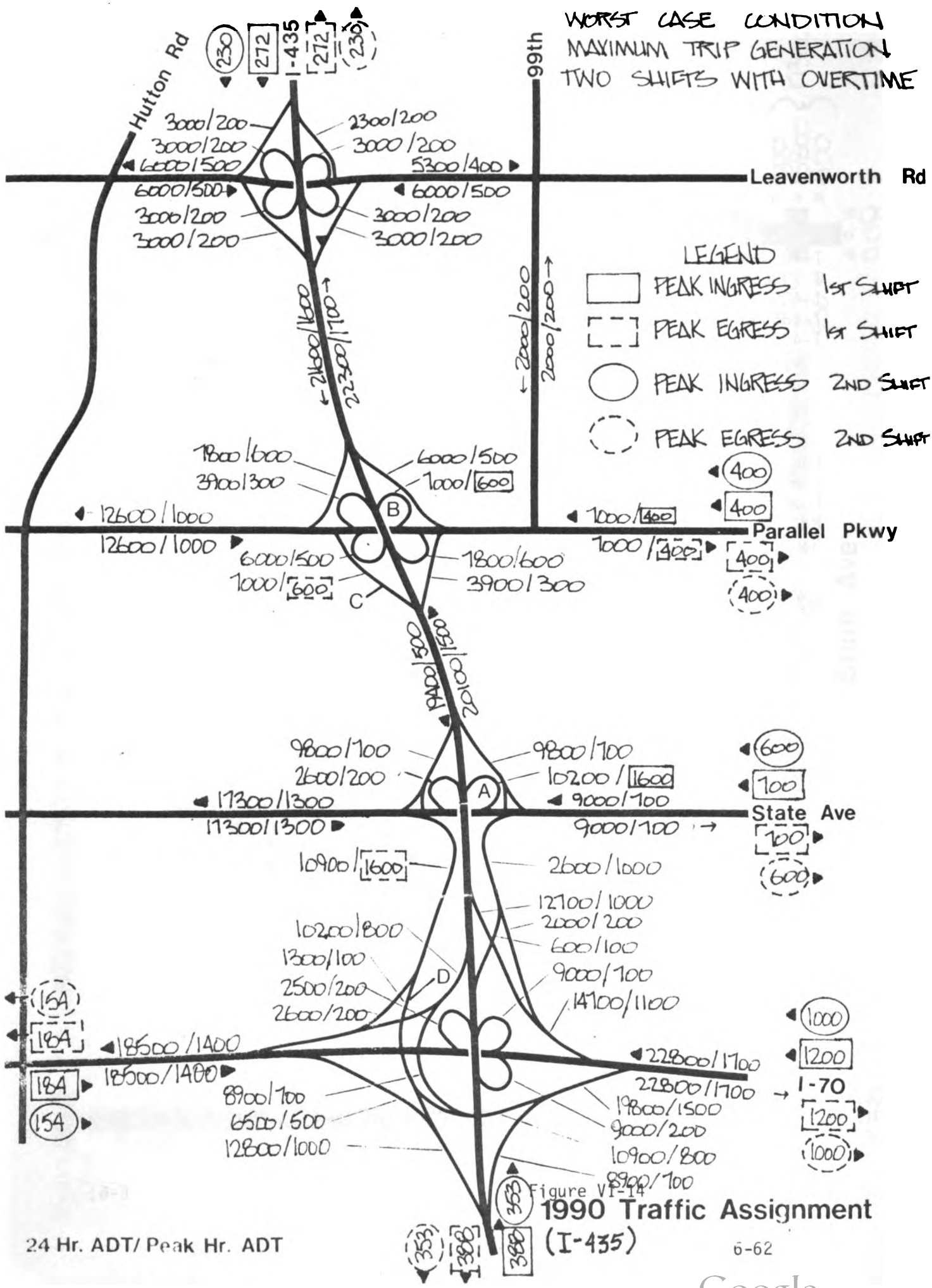


Figure VI-14
1990 Traffic Assignment
(I-435)

service. Including driveway openings on 118th Street near Parallel Parkway, and on Parallel Parkway would shift arterial and related ramp movements, potentially alleviating the congestion at ramp A, by encouraging the use of ramps B and C, and the arterial usage of State Avenue and Parallel Parkway, accessing the plant vicinity from the Turner Diagonal.

Information from General Motors officials indicates that typical daily operations will be significantly less traffic intensive than the worst case tested above.[1] Use of their assumptions, which include a 1.1 auto occupancy rate for employees, a normal two-shift operation with typical plant related truck activity and random visitations as illustrated in Table VI-20 will produce some 7,500 one-way trips, or an ADT of 15,000. The shift changes of importance are first shift inbound from 5:00 a.m. to 6:00 a.m., and first shift outbound occurring simultaneously with second shift inbound from 2:30 to 3:30 p.m. The arterial, near-plant, and freeway vicinity will load as shown in Figures VI-15, VI-16 and VI-17. Network ADT is lessened by approximately 25 percent, and the quality of traffic flow for freeway and ramp segments is as illustrated in Table VI-21. Adequate levels of service exist on all freeway segments proper, with variable levels of service C-D likely to exist in the weaving sections of I-435 north of I-70 and south of Parallel Parkway. Ramps B, C, D, and E operate at adequate levels of service. Loop Ramp A will exhibit congestion, operating at level of service D during the second shift inbound period from 2:30 to 3:30 p.m.

The above traffic analysis assumes timely construction of I-435, If this particular freeway link is excluded from the regional system due to federal budget constraints, and the plant is constructed without its presence, saturation of the arterial network in a vicinity within a ten-mile radius of the plant will occur. This situation may be relieved by construction of a State highway in the same location with similar design characteristics.

During the ensuing construction period, 40 concrete trucks, 4 steel trucks and 500 construction workers per day will access the plant, predominantly from the east.[2] This will increase current daily arterial traffic loads in the eastern corridor to the plant site by a total of approximately 1,000.

In a worst case projection projection, a maximum of eight (four inbound, four outbound) 65-car trains will access and egress the plant daily with loading and makeup occurring on the 520-acre site. Pure grade separations will be provided at all rail/street intersections except K-5 north of Wolcott, yielding no safety or congestion impacts on traffic in the immediate vicinity of the plant or the general study area.

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[1] Data supplied by letter on March 23, 1981 to Mr. Dean Katerndahl, Director of Economic Development for City of Kansas City, Kansas, from Paul E. Forney, Plant Access and Parking Project, Corporate Programs Department, General Motors Corporation.

[2] Discussion with Dick Baldwin, General Motors Plant Engineer, April 3, 1981.

TABLE VI-20

TYPICAL OPERATIONS - TWO SHIFT CONDITIONS

Shift 1

6 a.m. - 2:30 p.m.

2,700 Labor
457 Salary
3,157 Work Force x 1.2 trips/employee = 3,788

Shift 2

3:30 p.m. - 12 Midnight

2,482 Labor
191 Salary
2,673 Work Force x 1.2 trips/employee = 3,208

Shift 3

11 p.m. - 7:30 a.m.

144 Hourly Labor
26 Salary
170 Work Force x 1.0 trips/employee = 170

Material Handling + Auto Haulage Trucks 320

7,486

Call 7,500 Trips Generated

ADT of 14,972 or 15,000

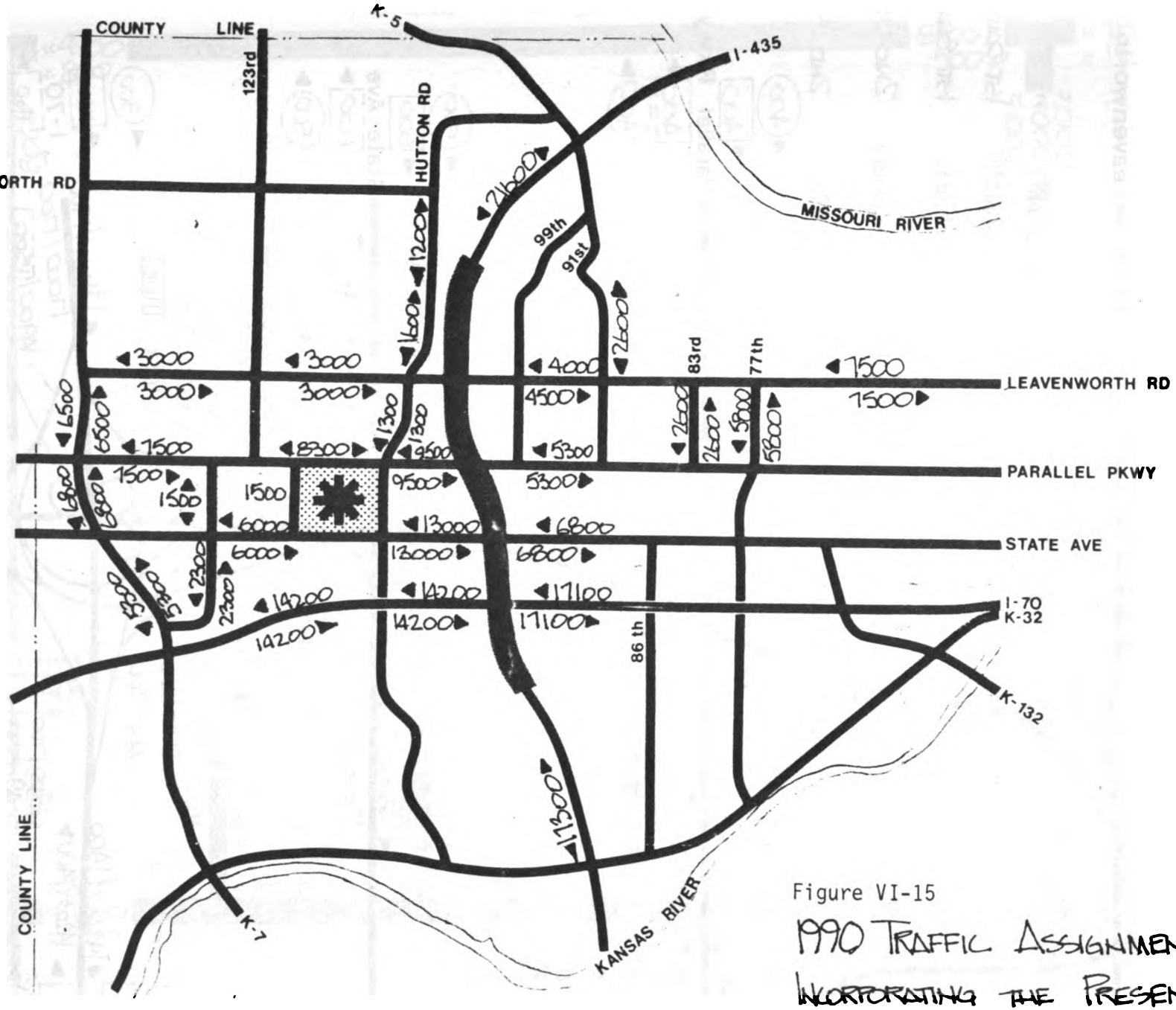

Figure VI-15

1990 TRAFFIC ASSIGNMENT INCORPORATING THE PRESENCE OF THE GM ASSEMBLY PLANT TYPICAL EXPECTED DAILY OPERATION

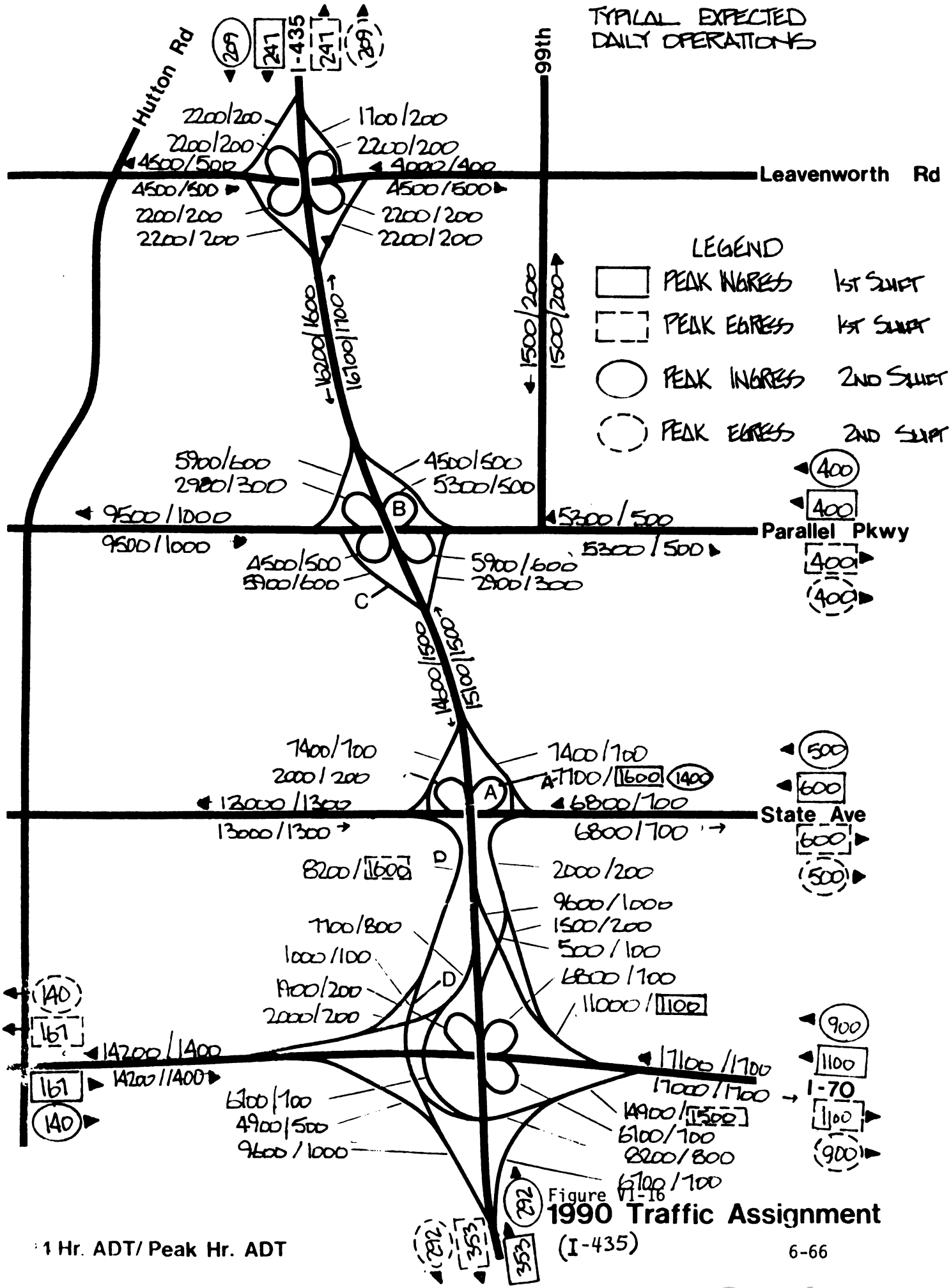

Figure VI-16
1990 Traffic Assignment
(I-435)

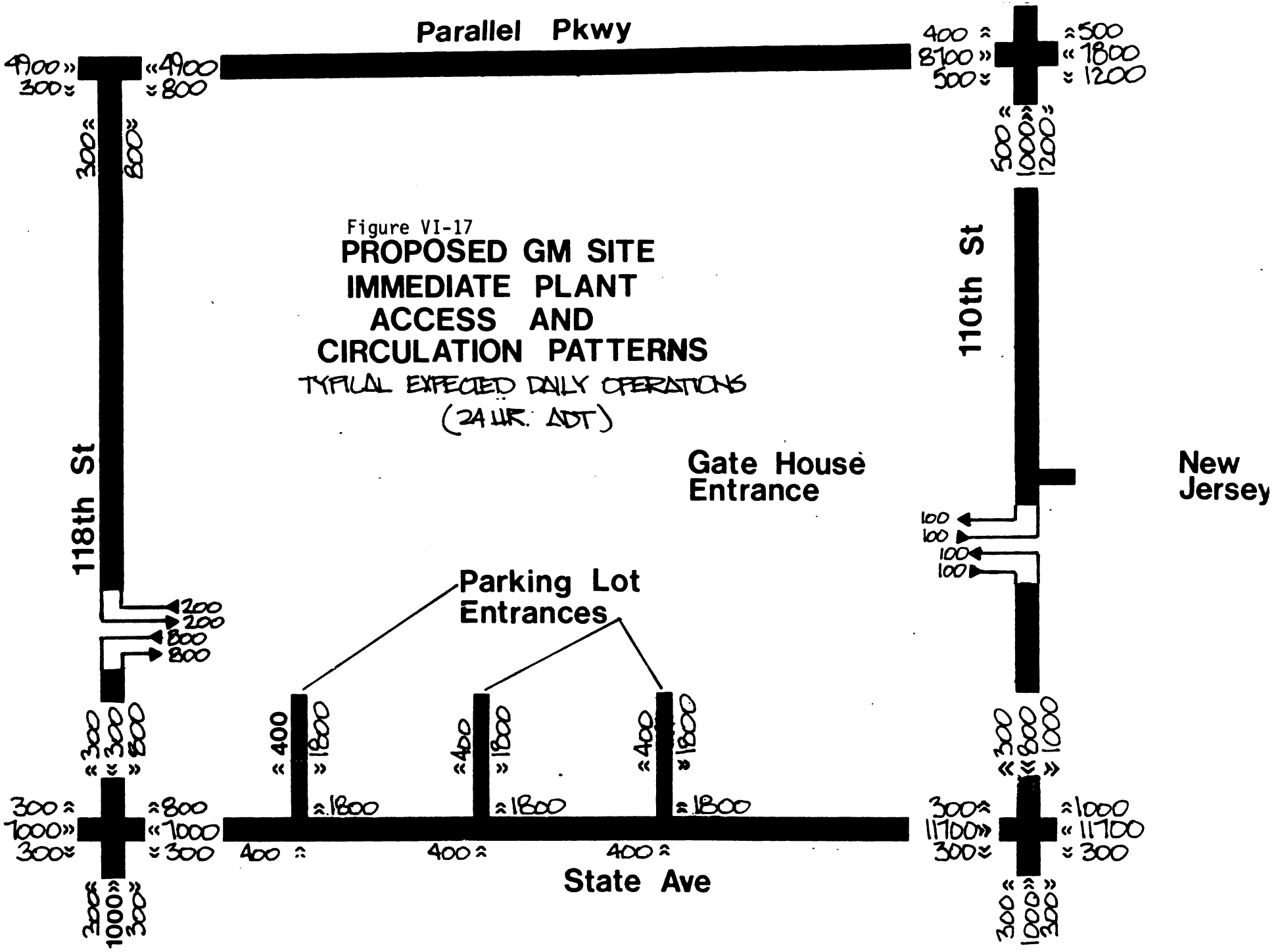

Figure VI-17

PROPOSED GM SITE
IMMEDIATE PLANT
ACCESS AND
CIRCULATION PATTERNS

TYPICAL EXPECTED DAILY OPERATIONS
(24 HR. ADT)

Based on the above findings, the impact of General Motors Assembly Plant traffic flow on the regional highway network and site locale street pattern as programmed for improvement is manageable and will not result in significant deterioration of the road network. In either "worst case" or "typical" daily plant operations, short-term congestion will occur at one particular loop ramp, termed Ramp A in the text. For "Worst case" operations, this congestion occurs during the morning first shift inbound period. During typical expected daily operations, this congestion occurs during the second shift inbound period in mid-afternoon. The timing of these periods of isolated ramp congestion is not co-incidental with normal commuting peak-hour periods, and should have negligible long-run impacts on the regional network operational behavior.

TABLE VI-21

QUALITY OF TRAFFIC FLOW EXPECTED - TYPICAL OPERATIONS

Segment	Level of Service (LOS)
I-70 West of I-435, EB	B
I-70 East of I-435, WB	B
I-435 South of I-70, NB	B
I-435 North of Leavenworth Road, SB	B
I-435 North of I-70 and South of Parallel Parkway	C-D
Critical Ramps	
Loop Ramp A	D-2nd Shift Inbound
Loop Ramp B	B
Loop Ramp C	B
Ramp D	C
Ramp E	C

6.7 MITIGATION METHODS

Vegetation and Wildlife

Impacts of the loss of tilled and pastured land on biological systems and their components are negligible. The loss of perhaps 80 acres of largely oak-hickory woods is unavoidable and more significant. Some mitigation of these impacts is built into the project. The rail lead track would be responsible for most of these impacts and should be designed to include berms and plantings to inhibit visual and noise pollution. The plantings are of unspecified area and species, but it is assumed that wildlife will be considered and that shelter and food producing species will be utilized. Furthermore, the rail line will have at least 200 feet of right-of-way for five to six miles. Railroad rights-of-way are excellent habitats for prairie species, both plant and animal. If they are managed by periodic burning rather than by herbicide treatment, these rights-of-way, including the track line, will provide habitat and refuge for prairie species which would otherwise not exist in the area.

Land Use

Potentially adverse land use impacts of the project, particularly the problems of land use transition generated by location of the plant, truck/rail yard and rail line will be mitigated by the City's adoption and enforcement of the Prairie-Delaware Master Plan. In this Master Plan (see Appendix D), a specific set of policies and guidelines for future development have been formulated which will prevent significant deterioration of the socio-economic environment. The following set of development standards from the Master Plan are quoted as specific measures to mitigate adverse land use impacts.

1. The development of land shall be in keeping with the Prairie-Delaware Master Plan approved by the City. The Master Plan shall include at least the elements of: (a) desirable land use patterns, (b) a workable long range major street plan and, (c) various types of open spaces. The plan shall be reasonable, responsive to market conditions and shall be subject to amendment from time to time when change is in the interest of the public.

2. Residential development shall be in two general types: urban and semi-rural. Urban residential development shall follow traditional standards of low, medium and high densities, paved streets, storm water controls, sanitary sewer services, high level water service. Full service by fire and police departments will be provided. Semi-rural residential development will generally follow standards presently observed by much of the planning area. Street surfaces may be narrower and without curbs, individual or private streets or rural water districts having lesser capacity may be used in lieu of city water supply. Larger lots will be required since waste water absorption, vehicular loading of the lower grade streets, and the rural life style must be accommodated.

3. Commercial development will be encouraged and controlled in relation to the major thoroughfare system. Commerce is deemed to be of 3 types:

(a) retail shops and stores generally known to downtown and in shopping centers; (b) service-retail, including automotive, food services, building materials and similar uses not found in shopping centers; (c) non-retail establishments including offices for the most part. The placement of these various types of commercial uses also shall be carefully related to the arterial street network, shall be in the form of orderly subdivisions or planned units and shall be in a transitional pattern so as to protect nearby residential property from harsh land use relationships.

4. Industrial development shall be encouraged on land that is related to the thoroughfare system in a fashion that will offer circulation of industrial traffic without disrupting residential neighborhoods. Generally, industrial uses will be encouraged on sizeable ownerships adjacent to freeways or other heavy-duty state roads, on land that is relatively level and to which all utilities can reasonably be extended. Industrial parks having low density development standards, substantial open space, landscaping and architectural control are preferred over small individual one-lot projects. It should be understood that the basis for the industrial development rationale is the strong need to create jobs for the economic improvement of this community.

5. Certain areas shall remain open or undeveloped land due to natural constraints on the property. Land having a natural slope of greater than 15%, land in a flood plain and property which may contain unusually fine forestation shall remain open or be treated in a manner that will sustain the values and usefulness of adjacent lands.

6. The conversion of land from an agricultural or open property to urban uses shall be of a reasonably contiguous pattern in order to reduce the cost of public services, avoid the controversies of "spot zoning" and assure that changing market conditions will not produce isolated urban projects which become "misfits" as the community continues to fill in.

7. Nonresidential projects shall protect the visual quality of adjacent residential property by way of screened walls, plantings, topographic separations, etc., to be provided and maintained by the nonresidential property owners.

8. The design of subdivisions shall be such that through traffic, especially of a commercial or industrial nature, will be directed away from residential neighborhoods.

9. The design of subdivisions and the assignment of land uses shall be such that drives on to arterial streets are widely spaced in order that traffic flow will be safe and expedient.

10. Residential uses shall be planned to back onto arterial streets and effective buffering against vehicular noise and commotion will be required in the form of landscaping, fences, walls, greater than normal setbacks, etc.

11. A large number of dwellings in the area which now enjoy a semi-rural life

style shall, to the greatest extent possible, remain free from the effects of urban development.

12. Detention of surface water on the site of large paved areas shall be required wherever practical in order to protect downstream properties.

13. Public and semi-public use areas such as the Agricultural Hall of Fame, county parks, religious and institutional grounds shall be protected from nearby development which may be degrading to or inhibit the use and enjoyment of said property.

14. Zoning procedures and standards shall be amended where necessary in order to:

    a. Have full public disclosure and scrutiny of rezoning proposals.

    b. Require site plan review of nonresidential projects by technical staff prior to permit issuance.

    c. Assure reasonably low densities in industrial, commercial and residential developments.

    d. Derive the highest practical aesthetic results from such special types of land use as mobile home parks, outdoor storage areas and outdoor advertising.

15. In the advent of a railroad spur, provide for the maximum protection of adjacent land by way of:

    a. Maximum use of topographic barriers to reduce visual and noise effects.

    b. Use of re-forestation wherever practical in order to reduce visual and noise effects.

    c. Assure, through government action,that safe crossings are provided and maintained at intervals of approximately one half mile.

    d. Assure, through government action, to the degree possible, that use of the rail will be limited to reasonable day time hours and that equipment used will be of a type and condition that minimal noise or other adverse effects will be emitted.

    e. The development of any industrial uses along the spur will be in an orderly and contiguous pattern and will conform to all preceding conditions and qualifications set out in this policy.

16. All development shall recognize the enormous cost of constructing and/or maintaining such public facilities and services as sewers, streets, water mains, street lights, police and fire protection services and others, to the extent that established service areas of such facilities, utilities and services shall be absorbed to a reasonable degree before additional

service areas are opened through additional investment. It follows that the zoning of lands for urban developments of various types may be delayed until the service areas already existing or under design for construction have been largely infilled with urban development.

17. It is recognized that farming represents a use of land that is highly valuable to the consuming public and provides economic benefits to the locality. It is also recognized that the rezoning of farmland to urban type zoning districts places economic pressure against the farming operation, in the form of distorted real estate values. Reasonable protection shall be given to land that is being productively farmed in order that scattered, highly speculative rezoning of small land parcels will be discouraged.

Population Relocation

Relocation of owners and tenants is subject to regulations promulgated by the U. S. Department of Housing and Urban Development for UDAG projects. See 24 CFR 570.457.

Air Quality

A variety of air pollution control devices will be employed in the General Motors plan to limit emission rates to comply with all Federal, State, and local regulations and standards. These devices represent the Best Available Control Technology (BACT).

Noise Control

Although noise produced by the proposed General Motors plant will not be severe,the plant should be designed with the aid of an acoustical engineer to assure that potential noise problems are mitigated in the design or construction phases. Specific noise mitigation methods are provided herein.

A berm will be constructed in the vicinity of the church and cemetery to shield these sensitive receptors from high noise levels generated by transient events. This berm has been included on GM's site design for the proposed plant.

The coal car shake-out facility should be enclosed in a steel structure similar to the shake-out building at the existing General Motors Oklahoma City plant. In addition, shake-out operations should be limited to the time period between 7:00 a.m. and 10:00 p.m.

General Motors production shifts and the traffic lights at the entrances/exits of the parking lot should be staggered to ameliorate traffic congestion and resulting vehicular noise.

During construction, all equipment should have efficient functional mufflers which comply with all applicable State and local laws, ordinances, and regulations relative to noise control. If helicopter operations are required as part of the plant construction, local residents should be informed at least

one week in advance. Construction should be continued at least six days a week to reduce the actual calendar period that local residents will be exposed to these elevated noise levels. Construction activities should begin after 7:00 a.m. and end prior to 10:00 p.m.

In addition, all noise mitigation techniques used by General Motors in their Oklahoma City plant should be utilized in the proposed plant. High sound levels generated by driving of piles along the rail spur may be mitigated in two ways: first, the concrete piles have a timber cushion which reduces the level of peak sound, and second, holes for the piles may be pre-drilled to within 5 feet of bedrock to reduce the duration of the operation.

Water Quality

Potential adverse stormwater runoff impacts will be mitigated by the on-site stormwater collection and retention system. This system will have the capacity to retain a 50-year rainfall and discharge it at a controlled rate into the natural drainageways. This system will also have the capability to contain a major spill of industrial fluids in one cell of the two-cell pond while collecting, retaining, and discharging (although at a higher rate of flow) the 50-year rainfall through the other cell.

Construction

An appropriate fence should be provided to control windborne debris and low level dust emissions. The construction site should also be sprayed with water and other dust suppressants to limit dust emissions. All trucks that enter and leave the site with earthen materials or unconsolidated debris should be loaded in such a manner as to prevent accidental spills on roadways. Furthermore, these trucks should have and employ suitable covers over their loads before leaving the proposed site; trucks delivering similar materials to the site should also be covered. In addition, the contractor should provide and operate a washing facility and crew to clean all truck wheels and exterior surfaces to prevent mud from being carried out of the site and deposited onto nearby roadways. Temporary catchment basins should be provided to mitigate erosion of surficial materials exposed during construction. In order to restrict pollution of surface waters, construction activities should be phased to limit the disturbed acreage exposed to surface erosion. Also, slopes should be maintained at least at a 3:1 maximum and either planted with grass or covered with straw or similar materials until the appropriate planting season to further prevent erosion.

Housing

Adverse impacts on housing resulting from implementation of the proposed action can be partially mitigated. Decrease in housing values or in the attractiveness of a residential neighborhood in the eyes of potential home buyers due to proximity to a rail line cannot be mitigated entirely. However, a variety of berms, plantings, and sound walls can reduce noise levels generated by the rail spur and partially remove it from sight.

6.8 Probable Adverse Impacts Which Cannot Be Avoided

Implementation of the project will result in a number of adverse impacts to the biogeophysical and socio-economic environments, most of which can be mitigated to some extent. However, if the proposed action were not adopted, a larger number of more significant adverse impacts would occur. Among the most serious of these impacts (which are presented in greater detail in Section 4.0) would be grievous economic and tax losses and significantly increased unemployment rates and social welfare costs due to loss of in dustrial jobs if General Motors were to move from the City. These serious problems, which would adversely impact all of the City's citizens, individual and corporate, would be avoided with implementation of the project. Tables IV-1 and IV-2 and Appendix E provide details concerning the nature and significance of these adverse impacts. The City has determined that these impacts are so significant to its continued stability that it identified the preferred alternative (implementation) as the only possible course of action.

Among the adverse impacts which cannot be mitigated entirely and resulting from implementation of the project are the following factors: long-term (permanent) change in the site's topography; irreversible loss of soil resources; short-term (limited to construction period) fugitive dust emissions; long-term (life of project) increased incandescence from project lights; long-term (life of project) localized diminution of air quality due to such transient meteorological events as thermal inversions; long-term (permanent) increases in traffic and traffic-related noise on local arteries; and a short-term slowing of housing value appreciation.

Almost all of these adverse impacts are categorized as having slight effects on the environment, with only increased traffic and traffic-noise as having moderate adverse impacts. However, it is judged that the project's long-term economic benefits to the City and region will more than offset the negative aspects.

The City will work very closely with General Motors and representatives of the Prairie-Delaware area to ensure that the mitigation techniques detailed in Section 6.7 are utilized to the fullest extent possible and will attempt to provide as many other methods of amelioration as are practical and economical.

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7.0 LIST OF PREPARERS

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PARTICIPATION AND COORDINATION

8.0 PARTICIPATION AND COORDINATION

8.1 PUBLIC PARTICIPATION

The first major public involvement in which the proposed project was discussed was a public meeting at the Kansas City, Kansas, Overall Economic Plan-Auto Community Assistance Program Committee meeting, October 12, 1980.

The second public meeting which involved the proposed project was the UDAG public meeting on October 16, 1980. Approximately 30 people attended. Numerous questions were raised concerning the specific nature of the project and the Environmental Impact Statement by the citizens. In response, preliminary details concerning relocation of the General Motors plant were provided; it was stressed that preparation of the EIS had just begun and no specific information about impacts was available.

The next public involvement, November 20, 1980, was the EIS Scoping Conference. This meeting was open to the public and to invited representatives of project-related public and private agencies. Approximately 35 individuals attended the conference which was covered by representatives of area newspapers, radio stations, and television stations. The meeting opened with a brief explanation of the Scoping Conference and the EIS. At that point, representatives of project-related agencies stated specific environmental concerns and the level of detail needed to address them properly. Numerous questions were raised by members of the Piper Area Association representatives; these questions were answered by the consultant and City staff members. All individuals in attendance were later mailed the minutes of the Scoping Conference as well as a formal letter from USEPA to the City stipulating their concerns in the project.

Another major project-related public involvement was a public meeting held by the Piper Area Association on December 10, 1980, in which the consultant responded to questions and comments raised by many of the 250 people in attendance.

The final public involvement for this project was the public hearing for the Draft EIS on March 24, 1981, at the Kansas City, Kansas, Municipal Building. This hearing was attended by approximately 50 citizens. Ten individuals entered their comments into the public record. These comments have been addressed in the Final EIS.

8.2 COORDINATION

This EIS has been prepared in coordination with Federal, State and local agencies, private firms, and institutions. A complete list of organizations and individuals contacted is given below in Table VIII-1.

TABLE VII-1

Federal Agencies

U. S. Army Corps of Engineers

Phillip Rotert
Robert McDowell
Mel Jewett

USDA Conservation Service

Gerald K. Krause

U. S. Economic Development Administration

Gordon Butcher
Environmental Review Officer

USEPA

Edward Vest
Linda Kirkland
Fred Brown
Vincent Smith
Jack Bale
Cecil Taylor
Robert Fennemore
Charles Whitmore

USHUD

Lance Long
Harold Berntsen

USDOI - Fish and Wildlife Service

Richard Raines
James Lute

State Agencies

Kansas Department of Health and Environment

Eugene Jantzen
Chief, Water Quality
Jack Travers
Donald Carlson
Industrial Discharge
Karl Mueldener
William Pedicino

Kansas Geological Survey

Howard O'Connor
Larry Hathaway

University of Kansas - Department of Economics

Darwin W. Daicoff, Ph.D.

Kansas State Historical Society

Richard Pankratz
Compliance Officer
Martin Stein
Historic Archaeologist

Kansas Bureau of Air Quality

Howard F. Saiger
Director

City Agencies

City of Kansas City, Kansas

Economic Development

Dean Katerndahl, Director
LaVerta Murray
Midge Nutman

Physical Planning

Gilbert Pintar, Director
Steven Speise
Lawrence Hanks

Air Pollution Control

Richard Michael, Director
John Cotter

Legal Department

Stephen Chinn

Water Pollution Control

Gyula Kovach, Director
Carlos Knight

Information and Research

Lewis Levin, Director
Scott Ramsey, Coordinator

Traffic Regulations

Richard Williams

Engineering

Gary Stubbs

Port Authority

Robert Settich, Director

Community Development

Steve Hults

Other Agencies and Institutions

Mid-America Regional Council

Ronald Guglielmino
Kenneth Howell
Patrick Hassett
Janice Hedemann
David Garcia
Frank Lenk

General Motors Corporation

Gerald Barnes
David Van Sickle
Barbara Spreitzer
Chet Zaleski
John Northrup
Roger Menke
Ralph Gwinn
Sterling Nelson

Board of Public Utilities

Melvin Heuer

Missouri Pacific Railroad

J. K. Wesley

Kansas City, Missouri
City Development

Robert Collins

Black and Veatch, Inc.

Management Services

Michael Smith

Union Gas Systems, Inc.

Harrison Johnson,
President

Wyandotte County Parks Department

Henry Wendt,
Director

Browning Ferris Industries

Stephen Montee

Wyandotte County Museum

Thomas Pfannenstiel,
Director

Savior of the World Seminary

The Reverend Thomas Tank,
Rector

Piper Unified School District #203

Dr. Ron Brown

Piper Area Association

Richard Rosenthal,
President
Charles Kugler
Richard Tice
Robert Miller
Bud Williams
Melissa Vossmer

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9.0 BIBLIOGRAPHY

9.1 GENERAL BIBLIOGRAPHY

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APPENDICES

10.0 APPENDICES

APPENDIX A

VEGETATION AND WILDLIFE - DATA AND OBSERVATIONS

APPENDIX A

VEGETATION AND WILDLIFE - DATA AND OBSERVATIONS

Ecosystems

Wyandotte County is flat to rolling at mid-county and becomes highly dissected at the bluffs of the Missouri River to the north. The study area, in western Wyandotte County, Kansas, is located on the upland of a peninsula of land at the confluence of the Kansas and Missouri Rivers. The eastern half of the County is highly urbanized, while the study area consists of open lands on broad ridge tops with scattered woodlands on the slopes along drainageways (Van Doren, et al., 1975).

The vegetation maps of Transeau, et al. (1940, Oosting (1950), Odum (1958), Owensby (1980), and Benton and Werner (1958) depict the Kansas City area as being generally ecotonal (or transitional) between the prairie to the west and north and the oak-hickory deciduous forest to the east and south. Deciduous forest intrudes into the prairie along the major river valleys and constitutes the forest vegetation of the region. The oak-hickory forest grades into prairie, forming savannah-like vegetation at the interface (Oosting, 1950, and Smith, 1977).

The dominants of the oak-hickory association include white, red, black, post, black-jack, shingle, and bur oaks with shagbark, shellbark, mockernut, and bitternut hickories throughout most of its range. Shingle and bur oaks are characteristic of the western prairie-forest savannah-like transition. Locally important oaks and hickories embellish this association. A number of subordinate species are found interspersed with the oaks and hickories, and many deciduous tree species are present in the early successional stages with the oak-hickory climax forest (Oosting, 1950) and in the forests of lesser stream valleys.

Tall-grass prairie once occupied a narrow north-south belt to the west of the deciduous forest (Smith, 1977). The oak-hickory forest intruded into this belt along river valleys. Big Bluestem, indiangrass, and switch-grass dominated tall-grass prairie, with subordinate tall and mid-grasses and a profusion of wildflowers (Owensby, 1980). In moist prairie, composites made up 26.1 percent of all species, grasses 10.2 percent and legumes 7.4 percent (Curtis, 1959). Natural fires maintained the prairie in some environments which were otherwise more favorable to oak-hickory. When settlers came, they eliminated these fires, allowing the forest and other non-prairie species such as bluegrass into the grassland (Curtis, 1959).

According to Owensby (1980), the study area is located in a region which was covered by a mosaic of "eastern subhumid prairie" and the oak-hickory association of the northeastern deciduous forest. Many species of wildflowers of this original prairie are rarely seen today because burning was discontinued,

allowing for natural changes in composition. Cultivation destroyed ecosystem and habitat. Only remnants of prairie with changed composition now exist east of the Flint Hills in Kansas (Owensby, 1980).

The proposed site is approximately 520 acres and lies between 110th and 118th Streets and Parallel Parkway and State Avenue about 12 miles west of downtown Kansas City, Kansas. Two longitudinal transects were considered: (1) an eastern route running from State Avenue north to the Missouri River bluff and located just west of and adjacent to the I-435 right-of-way and (2) a western route extending approximately north-northeast from the Parallel and 118th Street intersection. The two transects are roughly parallel to one another and range from 1.5 to 2 miles apart. The eastern traverse ends at the bluff approximately 0.5 miles southeast of Wolcott, and the western traverse ends at the bluff approximately 0.5 miles northwest of Wolcott.

Figure A-1 is the same as Figure V-2 in the text and illustrates the sampled locations described below. Refer also to the tables following the map which identify the specific species observed at each location.

Description of Locations Sampled on October 30 - November 2, 1980.

Location 1. This location is in a tongue of mixed successional forest along a drainageway in the north central part of the proposed plant site on Parallel approximately 0.5 mile west of 110th Street. The dominant species are elm, osage orange, silver maple, cottonwood, and black willow, a common drainageway combination.

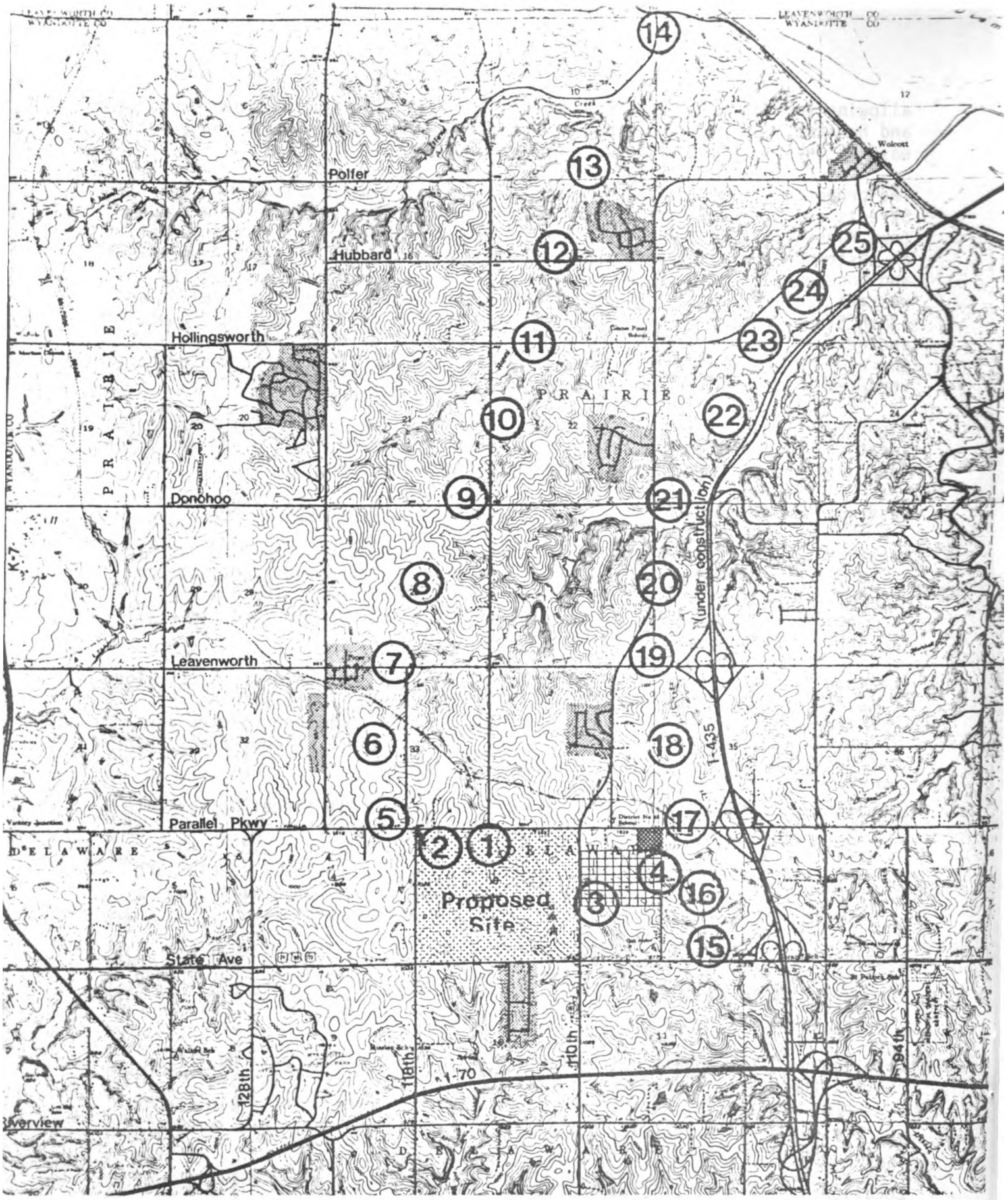
Location 2. This location is in a tongue of mixed successional forest along a drainageway in northwest corner of the proposed plant site at the intersection of Parallel and 118th Street. The dominant species are silver maple, osage orange, elm, shingle oak, black willow, black cherry, and hackberry, a common drainageway combination.

Location 3. This location is on the east side of 110th Street approximately 0.5 mile north of State Avenue and includes an oak-hickory woods of relatively large trees to the north and east of a cornfield, with a very young successional elm stand to the south. Dominant species are elm, chinkapin oak, honey locust, and osage orange; the latter two species are common in fence rows and in overgrown pastures.

Location 4. This site is located on the west side of 106th Street 0.5 mile north of State Avenue and consists of an oak-hickory woods surrounded by housing on the north, east, and south. The dominant species are black oak, shagbark hickory and chinkapin oak.

Location 5. This location is pasture land which has been uncared for an is, therefore, undergoing old field succession. It is located 0.1 mile north of Parallel on the west side of 119th Street. The field across the road to the east is in similar condition, and the field immediately to the north is in pasture.

Location 6. This site is agricultural land 0.1 mile west of 119th Street



Sampling Locations for Vegetation and Wildlife

Figure A-1

Proposed New GM Location

Proposed Truck/Rail Yard

Fire Station

0 2000 4000 6000 8000 10000ft

approximately 0.5 mile north of Parallel. Its cover consists of sorghum fields and pastures.

Location 7. This is an agricultural field located approximately at the northwest corner of the intersection of Leavenworth Road and 119th Street. Homesites are located to the south and sorghum fields to the north.

Location 8. This location is agricultural land approximately 0.5 mile west of 115th Street and 0.5 mile north of Leavenworth Road. It is covered by clean pasture.

Location 9. This location is agricultural land approximately at the intersection of 115th Street and Donohoo Drive. No natural vegetation occurs at this site. One side of the road is in pasture and the other is planted in winter wheat.

Location 10. This location is a successional stand on agricultural land located between Independence Boulevard and 115th Street and Donohoo Drive and Hollingsworth Road. The land is heavily pastured and thickly populated by brushy, spiny species.

Location 11. This location is a successional stand on agricultural land located approximately 0.3 mile east of 115th Street on Hollingsworth Road. It contains a continuation of the brushy, spiny pasture species referred to in Location 10. A sorghum field lies to the north.

Location 12. This location is located on agricultural land approximately 0.7 mile east of 115th Street on Hubbard Road. Both sides of the road are covered by pasture land, agricultural fields, and a small pine plantation.

Location 13. This location at the intersection of 107th Street and Polfer Road includes a very small stand of trees and shrubs surrounded by homes and pasture land. The vegetation is dominated by osage orange and white oak.

Location 14. This site is agricultural land located approximately 0.5 mile east of 107th Street on Wolcott Drive. The south side has a strip of forest edge bordering a soybean field. The north side is pasture. Elm and cottonwood dominate the strips of forest.

Location 15. This location is on agricultural land approximately 0.8 mile west of the Wyandotte County fairgrounds (98th Street) and north of State Avenue. It is surrounded by sorghum fields and pasture with several large pin oaks in the State Avenue right-of-way.

Location 16. This location is on agricultural land approximately 0.5 mile west of 98th Street and halfway between State Avenue and Parallel. The vegetation consists of fence row species which separates clean pasture to the west from a sorghum field to the east. The vegetation is dominated by elm and black walnut.

Location 17. This location is an abandoned field and homesite, as indicated by the presence of cultivated shrubs, halfway between 102nd Street and 116th Street on Parallel. A pasture lies opposite on the south side of the road.

Location 18. This location is agricultural land, approximately at the intersection of 106th Street and Georgia Road. Dominant tree species include osage orange, black walnut, and honey-locust. The area is used for a cattle range.

Location 19. This location is a farm and homesite which is being razed for improvements associated with I-435. It is approximately 0.2 mile east of 107th Street on Leavenworth Road. The vegetation consists of weedy species invading an abandoned yard, field and fence rows.

Location 20. This location is agricultural land approximately 0.2 mile east of 107th Street between Leavenworth Road and Donohoo Drive. The field supports a sorghum crop. The species listed on Tables A-1, A-2 and A-3 were found between the sorghum field and 107th Street. Two small lakes exist along 107th Street.

Location 21. This location is south of the stream (Connor Creek) behind the sewage treatment facility, approximately 0.2 mile east of 107th Street on Donohoo Drive. It consists of a steep bluff with large, old oaks and basswood. It has a few more unusual species, such as American filbert, hop hornbeam, and wild ginger.

Location 2. This site consists of a woods with large oaks. It is located approximately 0.5 mile east of 107th Street between Hollingsworth and Donohoo Drives on a steep valley wall overlooking a stream (Connor Creek).

Location 23. This location is agricultural land at the right angle turn in Hollingsworth Drive approximately 0.8 mile east of 107th Street. The species listed in the tables were those observed in fence rows and along the stream (Connor Creek). The principal vegetation consists of a clean pasture occupying the floor of the valley. Both walls of the valley are well forested with many oaks.

Location 24. This location is a successional woods on the east side of a farm lane approximately 0.5 mile south of the town of Wolcott on 97th Street. The vegetation is young and brushy with some large oaks interspersed. The woods appear to have been used as a cattle range. A clean pasture lies on the west side of the land.

Location 25. This site is a woods of large oaks and hickories on the Missouri River bluff along Wolcott Drive and is located approximately 0.2 mile northwest of the intersection of Wolcott Drive and 93rd Street. The woods is composed of large elm, cottonwood, sycamore and silver maple at the bottom of the bluff and large oaks, hickories and basswood on the top. Interesting species found include buckeye, wild ginger, hop hornbeam, and bladdernut.

References used for identifying species in Locations I-25, Tables A-1, A-2 and A-3 and their ranges were Steyermark (1963), Owensby (1980), Jones (1963), Preston (1976), Van Bruggen (1976), and Barkley (1977).

Wetlands

Intermittent streams and farm ponds constitute the only bodies of water in the study areas. Drainageways with poor internal drainage can be considered an extension of intermittent streams. No wetlands or wetland species were found in the study area. Concentric zones of successional vegetation are missing in the highly disturbed farm ponds.

Vegetation

In 1975, the study area consisted of approximately 90 percent openlands, 10 percent woodland (mostly along Connor Creek), and no urban area, flood plain or lakes and ponds. It contained a small amount of secondary stream in the lower reaches of Island and Connor Creeks (plate 5, Van Doren, et al., 1975). "Openlands" is a term coined to describe or identify land presently covered by pasture or by crops of various sorts. Of the woodland, most was oak-hickory found on valley walls in the Connor Creek drainage.

Four basic forests were recognized by Van Doren, et al. (1975): (A) pioneer forests, consisting of cottonwood and willow and found at or near the water's edge along the Missouri River, (B) mature flood plain forest of large cottonwoods with elm, mulberry, and other species, (C) hardwood flood plain forest composed largely of silver maple and hackberry, and (D) upland hardwood forest, made up of oaks, hickories, black walnut, and pecan. The project site is upland and its proposed spur sites reach only to the bottom of the bluff line of the Missouri River. Therefore, forest types A, B, and C do not occur in the study area; forest type D is the only one present. Young successional forests also occur, particularly in stream valleys and in poorly managed grazed lands. No prairie was observed, and only a few prairie species, such as sunflower, big bluestem, and cup rosinweed, were observed along roadsides and in abandoned fields. An inventory of species actually observed in the study area is included on Table A-1, Tree Species; Table A-2, Shrub and Vine Species; and Table A-3, Herbaceous Species.

Van Doren, et al. (1975, p. 34), recognized the following environmental systems (p. 34):

1. Pioneer Flood Plain
2. Mature Flood Plain
3. Hardwood Flood Plain
4. Upland Hardwood
5. Open and Grassland
6. Urban

and list the flora of the region with notes as to the systems with which each species may be associated. Van Doren, et al. (1975, p. 34), listed 64 tree species (p. 34, Table 13), 51 shrub and vine species (p. 35, Table 14) and 430 herbaceous species (pp. 35-57, Table 15), with most of the latter in the

sunflower and grass families. The survey reported herein actually found 37 tree species, 22 shrub and vine species, and 49 herbaceous species on approximately October 31, 1980 (see accompanying tables). The data of Van Doren, et al., were compiled from Gates (1944), Mackenzie (1902, McGregor (1948), and Preston (1961), Stevens (1969), and Weaver (1960).

Wildlife

The Kansas City region contains many habitats and, therefore, supports varied fauna (Van Doren, et al., 1975). However, the high degree of agricultural development and urbanization (suburbanization), accounting for approximately 90 percent of the area, has destroyed much habitat and destroyed or displaced many species. Habitat destruction has been selective. The flattest land which once supported tall grass prairie or oak-hickory has been utilized longest and developed to the greatest degree-farms and homesites are best located on flat land away from rough topography and poorly drained sites.

Invertebrates

At least 93 species of invertebrates were listed for the Kansas City region by Van Doren, et al. (1975, p. 38, Table 16) of which the Crustacea, Mollusca, and Annelida were the largest components. Most of the species listed are aquatic ones and some of these--clams, snails, crayfish, and insects among them--function as important food sources for such vertebrates as fishes, muskrats, mink, and raccoons. These data were obtained by Van Doren, et al., from Kansas City Power and LightCompany and St. Joseph Light and Power Company (1974) and the U. S. Army Corps of Engineers (Blue River Projects: 1974; Missouri River: 1974). The list reflects invertebrate species of aquatic habitats; however, this study area is limited in these habitats. The study area has no bodies of water larger than 40 acres (Van Dorean, et al., 1975), but it does have two intermittent stream drainages: Conner Creek to the east and Honey Creek-Island Creek to the west. These become secondary streams at their lower reaches as they approach the level of the flood plain near the bluff. There are also a number of farm ponds in the study area but these are small, located on pasture lands and, therefore, subject to disturbance by cattle and pollution from cattle wastes.

Amphibians

A number of amphibians and reptiles exist in the Kansas City region. Amphibians require an aquatic habitat during at least a portion of their life cycles and are usually found near water. They consume insects and other small animals and are in turn preyed upon by bitterns, herons, raccoons, mink, muskrats and skunks. Van Doren, et al. (1975, p. 39, Table 17), listed 18 species of salamanders, frogs and toads for this region. Since the ponds of the region are used intensively by cattle, it can be inferred that few of these bonds harbor many pond-margin species. In fact, wetland plant species were remarkably absent from ponds, presumably due to trampling.

Reptiles

Reptiles are characterized by scaly skin which is rather impervious to water and makes them adapted to terrestrial conditions. Water snakes and certain turtles (snapper, soft-shelled, and others) are aquatic when active, whereas others--copperheads, rattlesnakes, and box turtles--are largely terrestrial in their habits. Although some turtles are vegetarians, others are omnivores or carnivores (and/or carrion feeders). Snakes and lizards prey on smaller animals and eggs. Van Doren, et al. (1975, p. 39, Table 17), listed 12 turtle species, 8 lizard species, and 28 snake species in the region. Aquatic species would be expected to be less numerous than listed due to the shortage of undisturbed ponds and lakes, wetlands, and slow perennial streams. Terrestrial species would also be less numerous than expected because of the amount of land in suburban housing and intensive agriculture. The best habitat for terrestrial species would be in locations 21-25 (Figure A-1) which are the most mature, precipitous, and undisturbed wooded locations in the study area. Most of the information on amphibians and reptiles in Van Doren, et al. (1975), was compiled from Anderson (1942, 1965), Carr (1952), Collins (1974), Smith (1956), and Wright and Wright (1957).

Fish

Two intermittent streams and a number of farm ponds are found in the study area. Some ponds might be expected to have largemouth bass, crappie, green sunfish, bluegill, yellow bullheads, or channel catfish, as these are commonly stocked. Intermittent streams might be expected to have species such as fathead minnows, green sunfish, carp, and an occasional largemouth bass, all of which either survive the dry season in deep pools or disappear and are restocked from downstream. Very few species can be anticipated in the study area due to its paucity of suitable habitat. Van Doren, et al., (1975), p. 40, Table 18), listed 80 species of fish for the Kansas City region, but it must be remembered that many of these are found in (A) larger lakes or ponds, (B) clear "ozark streams" and (C) major rivers and streams. The data on fish species were obtained largely from the U. S. Army Corps of Engineers (Missouri River, 1974), Cross (1967), Upper Mississippi River Conservation Committee (1967), Jordan, et al., and Pflieger (1971).

Birds

Many people are attracted to bird-watching and many of these amateurs generate seasonal data on sightings of species. Most bird species are migrants. They eat seeds, fruits, insects, small vertebrates or carrion. The unique ability of birds to fly allows them to colonize habitats even when these are somewhat isolated, and it further enables them to utilize various food sources in diverse locations. Van Doren, et al. (1975, p. 41, Table 19, listed approximately 301 species of birds for the region. The sources used were the American Ornithological Union (1970, Bennitt (1932), Bunker (1913), Goss (1891), Johnsgard (1968), Johnston (1965), Loery (1970), and Tordoff (1956).

The area is 90 percent open space which affords very little cover for the

many species which require it. Furthermore, this open space is largely pasture and row crops which are attractive to and habitat for relatively few species. The 10 percent in forests (in sampling locations 21-25, Figure A-1) represents the only cover available for those bird species requiring it, such as blue jays. Mourning doves were abundant in the edge habitats of fence rows. A few hawks were observed and these probably roost and nest in the high trees of the oak-hickory forests. Except for the birds of the limited woodland and those of the open fields, the only other species found are probably those inhabiting the yards of homesites in the area, such as robins, house sparrows, mockingbirds and the like. Aquatic habitat birds may be abundant on the flood plain but very little of this habitat is available in the study area.

Mammals

Van Doren, et al. (1975, p. 42, Table 20), listed 52 species of mammals in the region, of which the following might be rather visible: opossum, mole, shrews, bats, chipmunk, gray and fox squirrels, woodchuck, mice and voles, muskrat, cottontail, raccoon, foxes, coyote, and deer. The most visible ones are squirrels and woodchucks. One homeowner commented that coyotes are common. Deer and other mast eaters probably occupy the oak-hickory woods. The openness of the study area precludes an abundance of both many species and individuals. The lists in Van Doren, et al., were compiled from Cockrum (1952), Hall (1955), Knox (1875), Powell, et al. (1972), and Schwartz and Schwartz (1959)

Endangered or Threatened Species

A species may be rare but is not endangered unless its numbers are declining. Many species have always been rare. In recent years, the ecosystems of the midwest, especially the tallgrass prairie, have been destroyed for agriculture; wetlands have been drained for agriculture; and small areas have been cleared for homesites. No one farm or homesite has been disastrous to an ecosystem as a whole, but the cumulative effects of man's activities, including pollution as well as development, have been. For example, theloss of one wetland can be acceptable, but the cumulative effect of many losses is quite harmful. As an example, migrating birds may stop at a prairie in a particular location every season. If the prairie is tilled, they can stop at another some short distance away. If all the prairie is tilled in a given area, as it has been, then there may be no resting, feeding or breeding habitat left, and the species in question may become reduced in number and geographic range or it may become extinct.

The point is that agriculture and other human activities have already removed a great deal of habitat, particularly in the midwest and east, and many species which once inhabited these regions are now non-existent or reduced in numbers or range. Many of the species we observe today are the survivors. Their needs are not inconsistent with present-day levels of environmental stress; they can survive and reproduce in this altered environment. These species include raccoon, opossum, deer, muskrat, woodchuck, skunk, elm, must thistle, osage orange, mulberry, coralberry, poison ivy, black cherry, and others. Some species, however, are on the threshold of

extinction locally or nationally. In Kansas City, which is ecotonal, between former prairie to the west and forest to the east, there may be species which are endangered to the west but not to the east and those which are endangered to the east but not to the west, depending on which of the two biomes a species normally exists in. Furthermore, there are species which occupied the river or river flood plain which have no affinith for either prairie or forest.

Van Doren, et al. (1975, p. 43, Table 21), listed six species of plants, all orchids, as threatened or endangered in the Kansas City region. No nationally endangered species of plants have ranges which extend into this general area. The data in Van Doren, et al. (1975), are largely obtained from the Missouri Department of Conservation and the U.S. Department of Agriculture (1974).

Van Doren, et al. (1975, p. 43, Table 22), also listed 62 species of endangered or threatened fauna, including five bat species, nine other mammals, 22 birds, 17 fishes, five snakes, and four amphibians. Of these, four are endangered in Kansas, 22 are threatened or rare in Kansas, 21 are endangered in Missouri, and 23 are threatened or rare in Missouri. One species was listed as nationally endangered, the Indiana bat. This species overwinters in caves and its critical period for survival seems to be during its hibernation. In the summer, Indiana bats disperse and feed and breed in mature flood plain forests. An upland project should not do anything to further endanger them. Van Doren, et al (1975), obtained their information on endangered, threatened and rare species from the Kansas State University Cooperative Extension Service (1974) and the Missouri Department of Conservation and the U.S. Department of Agriculture (1974).

The bald eagle feeds on fish and carrion and is generally associated with rivers and large bodies of water. It feeds from the water and shoreline and roosts in large trees along the body of water (probably cottonwood, black willow, and silver maple). This species was identified by the Fish and Wildlife Service as possibly being in the project area. It seems more likely that the bald eagle would range and roost along the Missouri and Kansas Rivers than in the upland areas around the site.

Table A - 1. Tree species in relation to location. Locations 1-4 were in the proposed construction site, locations 5-14 were at half-mile intervals along the proposed western rail spur, and locations 15-25 were at half-mile intervals along the proposed eastern rail spur.

Species Binomial	Common Name	Sampled Locations																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Acer negundo	Box Elder	*	*										*	*	*			*								
Acer saccharinum	Silver Maple	*	*															*								*
Aesculus glabra	Ohio Buckeye																									*
Ailanthus altissima	Tree of Heaven																	*								
Albizia julibrissin	Hardy Mimosa																	*								
Asimina triloba	Pawpaw														*											*
Broussonetia papyrifera	Paper Mulberry																			*						
Carya ovata	Shagbark Hickory				*																				*	
Carya sp.	Hickory			*	*															*						*
Celtis occidentalis	Hackberry	*	*	*	*								*		*	*			*				*			
Diospyros virginiana	Persimmon												*													
Fraxinus americana	White Ash				*																					*
Gleditsia triacanthos	Honey-Locust	*		*							*	*							*	*						
Juglans nigra	Black Walnut													*	*		*		*				*	*		
Juniperus virginiana	Red Cedar	*		*									*	*						*					*	
Maclura pomifera	Osage Orange	*	*	*		*								*	*			*	*						*	
Morus rubra	Red Mulberry		*	*																				*		
Ostrya virginiana	Hophornbeam																					*				*
Pinus resinosa	Red Pine												*													
Platanus occidentalis	American Sycamore																							*		*
Populus deltoides	Cottonwood	*	*												*			*								*
Populus sp.	Lombardy Poplar																	*								
Prunus americana	American Plum										*	*	*							*						
Prunus serotina	Black Cherry	*	*	*	*								*				*	*				*				
Quercus alba	White Oak													*					*			*				
Quercus imbricaria	Shingle Oak		*	*	*							*	*				*							*		
Quercus macrocarpa	Bur Oak			*	*									*								*	*	*	*	
Quercus muehlenbergii	Chinkapin Oak		*	*	*									*	*		*			*	*		*		*	*
Quercus palustris	Pin Oak															*										
Quercus rubra	Red Oak			*	*							*	*	*	*		*					*	*	*	*	*
Quercus velutina	Black Oak			*	*																					
Robinia pseudoacacia	Black Locust	*	*																							
Salix babylonica	Weeping Willow																	*								
Salix nigra	Black Willow	*	*															*								
Tilia americana	American Basswood																					*				*
Ulmus americana	American Elm	*	*	*	*							*	*	*	*	*	*	*	*	*	*		*	*	*	*
Ulmus pumila	Siberian Elm																	*								

Table A - 2. Shrub and vine species in relation to locations. Locations 1-4 were in the proposed construction site, locations 5-14 were at half-mile intervals along the proposed western rail spur, and locations 15-25 were at half-mile intervals along the proposed eastern rail spur.

Species Binomial	Common Name	Sampled Locations																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Celastrus scandens	Climbing Bittersweet												*												*	
Cornus drummondii	Rough-leaved Dogwood	*	*			*						*	*	*			*	*	*		*	*	*		*	*
Corylus americana	American Hazelnut												*	*	*							*				
Crataegus sp.	Hawthorn		*	*												*										
Euonymus sp.	Euonymus (cultivar)																	*								
Ligustrum sp.	Privet (cultivar)																	*								
Lonicera sp.	Honeysuckle (cultivar)		*																							
Menispermum canadense	Moonseed														*										*	
Parthenocissus quinquefolia	Virginia Creeper				*																					
Rhus glabra	Smooth Sumac	*														*	*			*	*		*		*	
Rhus radicans	Poison Ivy		*	*											*					*		*	*		*	
Ribes missouriense	Missouri Gooseberry																		*			*	*			*
Rosa multiflora	Multiflora Rose	*	*			*										*	*	*								
Rubus occidentalis	Black Raspberry		*																							
Rubus pensilvanicus	Bramble		*									*					*						*		*	
Sambuscus canadensis	American Elder	*	*												*			*					*			
Smilax sp.	Greenbriar	*	*		*									*	*		*		*			*	*		*	*
Staphylea trifolia	Bladdernut																									*
Symphoricarpus orbiculatus	Coralberry	*		*	*						*	*	*	*	*	*		*	*			*	*		*	*
Syringa	Lilac (cultivar)																	*	*							
Viburnum prunifolium	Black Haw			*																						
Vitis sp.	Wild Grape	*	*		*										*								*	*	*	*

Table A - 3. Herbaceous species in relation to location. Locations 1-4 were in the proposed construction site, locations 5-14 were at half-mile intervals along the proposed western rail spur, and locations 15-25 were at half-mile intervals along the proposed eastern rail spur.

Species Binomial	Common Name	Sampled Locations																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Abutilon theophrasti	Velvetweed					*																				
Amaranthus retroflexus	Rough Pigweed																		*							
Ambrosia artemisiifolia	Lesser Ragweed					*							*						*	*						
Ambrosia trifida	Giant Ragweed	*	*									*						*	*	*	*					
Ampelamus albidus	Bluevine	*																								
Andropogon furcatus	Big Bluestem																									
Asarum canadense	Wild Ginger																									
Asclepias syriaca	Common Milkweed		*																			*				*
Aster simplex	Tall White Aster	*	*			*										*	*	*	*	*		*				
Barbarea vulgaris	Yellow Rocket		*																							
Bromus inermis	Brome Grass			*																						
Capsella burea-pastoris	Shephard's Purse	*	*																							
Carduus nutans	Musk Thistle	*	*			*								*												
Chenopodium album	Lambs Quarters	*	*											*				*								
Datura stramonium	Jimson Weed															*			*	*						
Desmanthus illinoensis	Prairie Mimosa																									
Digitaria sanguinalis	Crab Grass	*																			*					
Elymus arenaria	Wild Rye														*											
Erigeron annuus	Daisy Fleabane																		*		*				*	
Festuca elatior	Tall Fescue					*							*	*							*					*
Geum canadense	White Avens	*	*																*							
Helianthus annuus	Common Sunflower	*			*												*				*					
Hemerocallis fulva	Orange Daylily																			*						
Lespedeza stipulacea	Korean Clover																								*	
Medicago sativum	Alfalfa																				*					
Mollugo verticillata	Carpetweed		*																				*			
Monarda fistulosa	Bee Balm											*			*				*							
Oenothera biennis	Evening Primrose	*	*																	*						
Oxalis stricta	Yellow Wood Sorrel		*																							
Panicum virgatum	Switchgrass																		*	*	*				*	
Phryma leptostachya	Lopseed														*											
Physalis heterophylla	Ground Cherry																		*	*						
Phytolacca americana	Pokeweed	*	*															*	*	*						
Plantago lanceolata	English Plantain																			*						
Plantago rugellii	Rugel Plantain																		*							
Polygonum aviculare	Knotweed																				*					
Polygonum convolvulus	Black Bindweed	*	*															*								
Rumex crispus	Sour Dock											*		*												
Rumex obtusifolius	Bitter Dock		*																							
Sanicula gregaria	Black Snakeroot		*																			*				*
Setaria lutescens	Yellow Foxtail											*													*	
Setaria viridis	Green Foxtail	*				*								*			*		*	*	*					
Silphium perfoliatum	Cup Rosinweed																	*								

Table A - 3. (continued)

Species Binomial	Common Name	Sampled Locations																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Solanum americanum	Black Nightshade																	*								
Solidago missouriensis	Missouri Goldenrod	*	*	*								*	*				*	*	*	*			*	*	*	*
Taraxacum officinale	Common Dandelion		*																							
Urtica dioica	Tall Nettle	*	*												*											
Verbascum thapsus	Mullein															*										
Xanthium pensylvanicum	Cocklebur																		*							

APPENDIX B

NOISE ASSESSMENT

APPENDIX B

NOISE ASSESSMENT

Noise Measurements

Two types of noise measurements were made in the course of this study: overnight monitoring and 15-minute tape recorded time histories of the noise. The equipment used for the overnight noise monitoring included a Metronics db602 Sound Level Analyzer and a General Radio (GR) 1945 Community Noise Analyzer. The analyzers were placed in a secure area where they could be padlocked to a permanent fixture. The monitors were then calibrated and visited 24 hours later to read the sound levels. From time to time during the day, as EDI personnel passed the monitoring locations, hand-held meter readings were tabulated to verify results from the noise monitors.

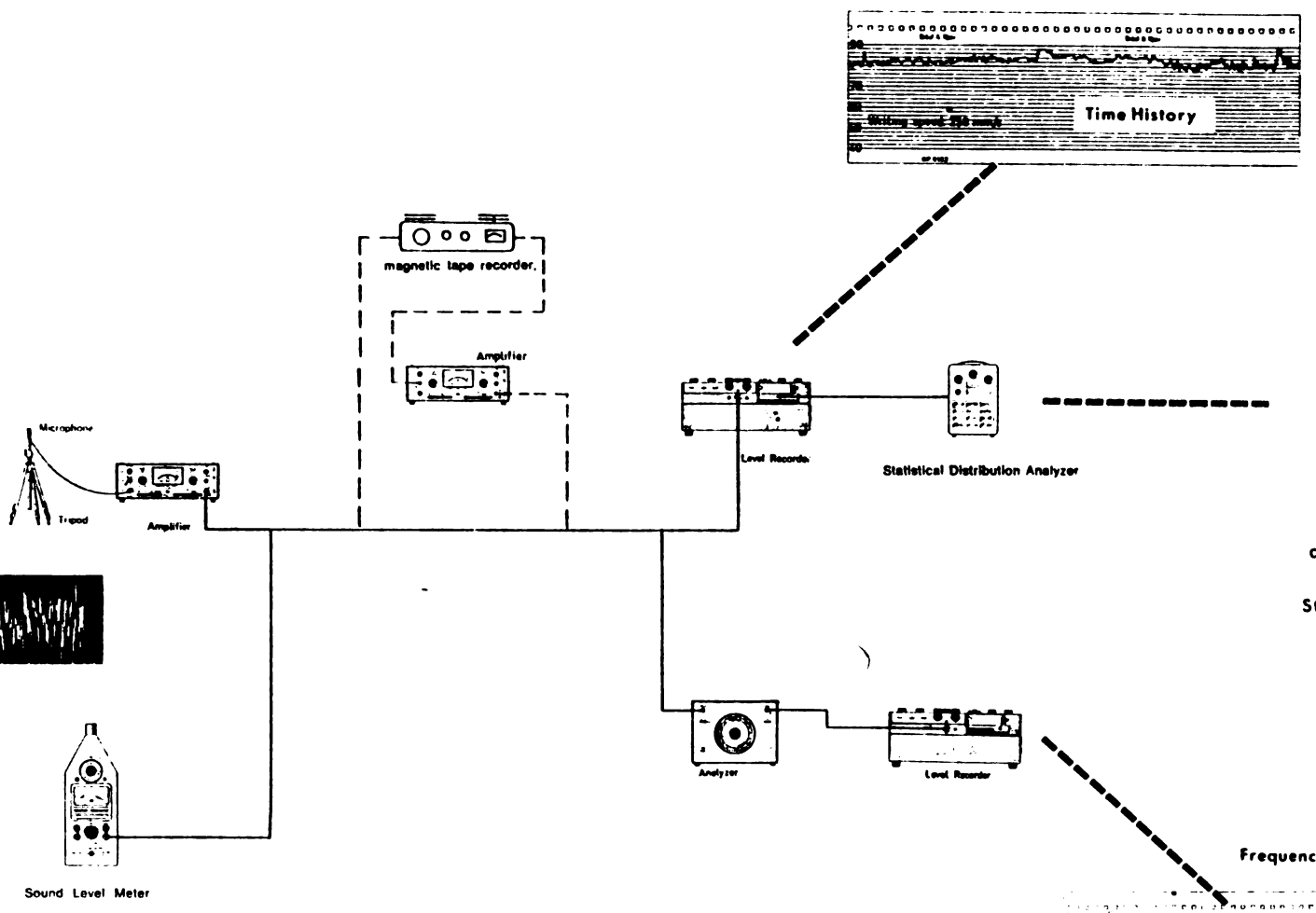
The 15-minute tape recorded time histories were made using a Bruel & Kjaer (B&K) 2203 Type II Sound Level Meter and a Nagra DJ Tape Recorder. Figure B-1 visually highlights the pertinent parts of this analysis. The tape recordings were brought back to EDI's lab where they were played into a B&K 2305 Level Recorder connected to a B&K 4420 Statistical Distribution Analyzer. These produced time histories of noise and a distribution of the noise levels from which various statistics were obtained.

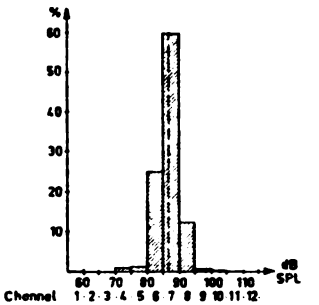
Results of the Noise Tests

Figure B-2 presents results of the noise monitoring at Site 1 along State Avenue, Kansas City, Kansas. Maximum sound levels occurred at approximately 7:30 A.M. and 5:00 P.M. when the L_{10} levels reached 72 dBA. These L_{10} levels dropped briefly to 50 dBA at approximately 3:00 A.M. The L_{eq} levels similarly peaked at 7:30 A.M. and 5:00 P.M., dropping to 55 dBA at 3:30 A.M. The L_{eq} values from Figure B-2 yield an equivalent level for the day (L_d) of 68.3 dBA and an equivalent level for night (L_n) of 63.0 dBA, which yields a day-night equivalent sound level (L_{dn}) of 70.7 dBA. These are typical values at a distance of 40 feet from a source of urban traffic.

Also, shown on Figure B-2 are the L_{90} levels (the levels exceeded 90 percent of the time). These levels can be thought of as background sound levels and represent sounds reaching the monitoring location along State Avenue due to sources relatively far from the monitoring location. These L_{90} levels reached their maximum at 7:30 A.M. and 5:00 P.M., dropping to approximately 40 dBA from midnight to 6:00 A.M.

Table B-1 presents the results of the overnight noise monitoring at Sites 2 and 4. The L_{10} level at Site 2 is 55 dBA and the L_{dn} value is 59 dBA. The L_{10} values at Site 4 range from 41 dBA during late evening to 47 dBA at night to 52 dBA for morning and early afternoon. The L_{eq} values for the same time periods are 41, 45, and 49 dBA respectively; giving an estimated L_{dn} of 52 dBA.





Statistical Distribution of Noise Levels

Figure B-1 Basic Noise Measurements

Basic Noise Measurement & Analysis System

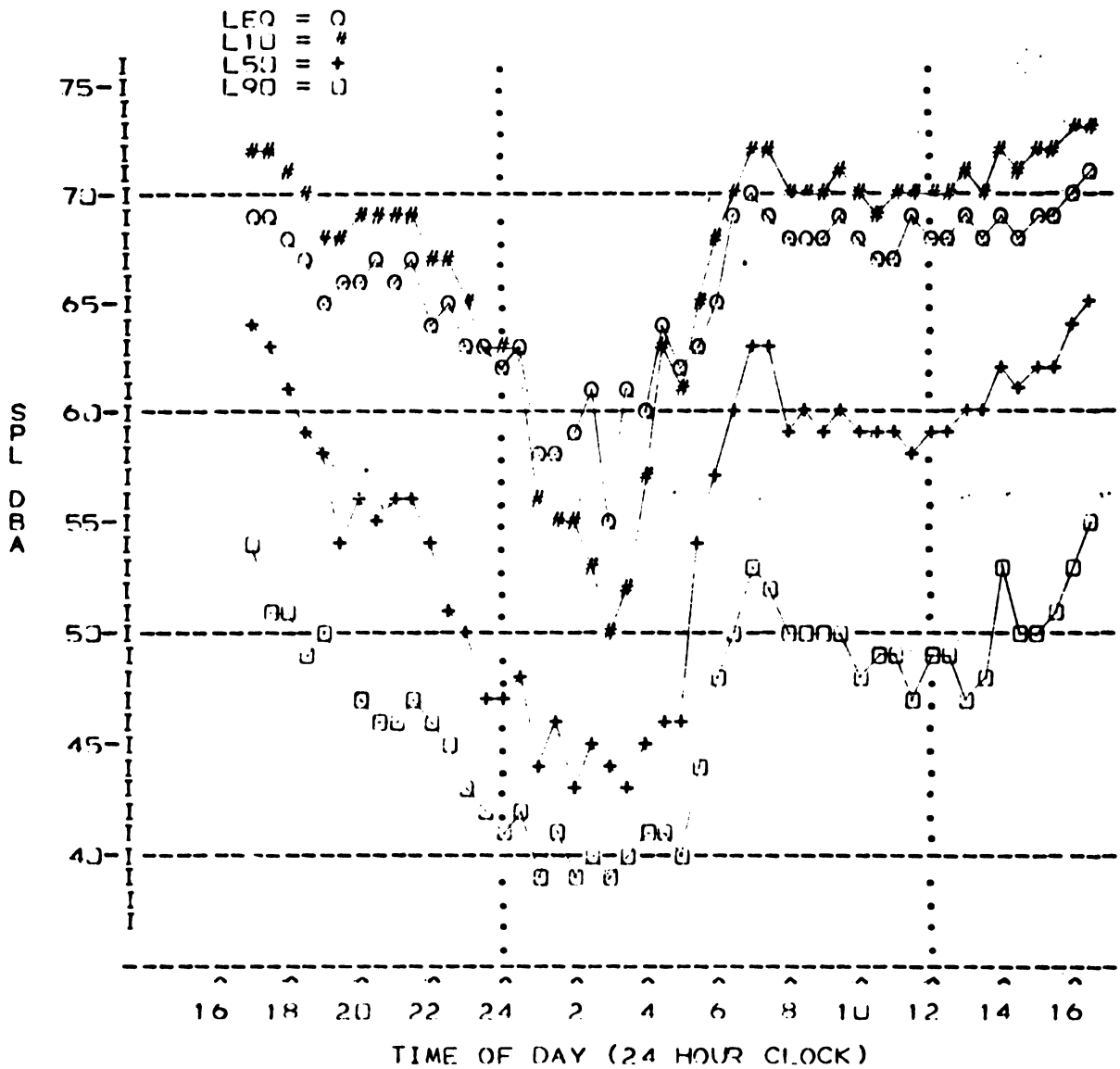


Figure B-2 Results of the Noise Monitoring at Site 1 - Along State Street, Kansas City, KS; 4:45 p.m. December 3, 1980 to 4:40 p.m. December 4, 1980.

Table B-1

Results of the Noise Monitoring at Sites 2 and 4,
Kansas City, KS

Site 2 - North boundary of the proposed GM Plant site, near present church and cemetary and at site of proposed Coal Car Shake-Out.

Time: 5:15 p.m., December 3 - 5:15 p.m., December 4, 1980

L_{MAX}	L_{10}	L_{50}	L_{90}	L_{min}	L_{dn}
82	55	44	38	32	59

Site 4 - 5328 North 109th Street, 4 miles north of the proposed GM Plant site, near the location of the proposed Rail Spur.

Time: 7:30 p.m., December 4 - 2:30 p.m., December 5, 1980

Time Period	L_{MAX}	L_{10}	L_{50}	L_{90}	L_{min}	L_{eq}
7:30 p.m.-10:30 p.m.	68	41	35	31	27	41
10:30 p.m.-6:30 a.m.	69	47	39	35	30	45
6:30 a.m.-2:30 p.m.	73	52	45	39	35	49

Estimated L_d=49 L_n=45 L_{dn}=52

Figure B-3 presents the time history plot from tape recordings made at Site 3 at 113th and Ann, Kansas City, Kansas. On this time history, the major source of noise is wind gusts of 10 to 15 MPH from the south (wind blowing from I-70 toward the site). Also in this time history, cars passing within 15 feet of the microphone raised sound levels over 70 dBA. At the beginning of the time history, the sound level dropped below 45 dBA. This is in agreement with tabulated sound readings taken on December 4, 1980. Sound levels in the absence of wind at this site would range between 40-50 dBA except during the rush hour periods of 7:00 A.M. and 5:00 P.M. This agrees very well with theoretical predictions of I-70 traffic noise.

Based on results of the monitoring given in Figure B-2, the sound levels can be expected to drop below 40 dBA from time to time during the night.

Figure B-4 shows a time history plot of the tape recordings at Site 5 at 118th North 55th Street, Kansas City, Kansas. This tape recording was made during Friday rush hour traffic. Traffic on State Avenue was stop-and-go; traffic on I-70 was approximately 90 percent of the maximum flow rate. Background levels ranged from 47 to 50 dBA with periodic car and truck passbys 10 feet from the microphone raising the levels to 70 dBA. This tape recording further verifies that sound levels at Site 3 range between 45 and 50 dBA.

Description of Construction Activities

Construction activities at the proposed GM plant site in Kansas City, Kansas, can be divided into the following phases:

1. Demolition
2. Rough ground clearing
3. Utilities
4. Excavation
5. Foundation
6. Above grade
7. Landscaping
8. Power house

Demolition:

The area in question is rolling farm land and contains three houses and a small, dried-up creek bed. The demolition activity at this site is very minor and will probably be completed in less than one month.

Rough Ground Clearing and Excavation:

The rough ground clearing and excavation will last approximately five months. The rolling farm land will be leveled. The 45 scrapers on site to level the rolling farm land are the principal contributors to the construction site sound levels. This phase of construction produces the most noise impact. At the very beginning of the excavation phase, a berm will

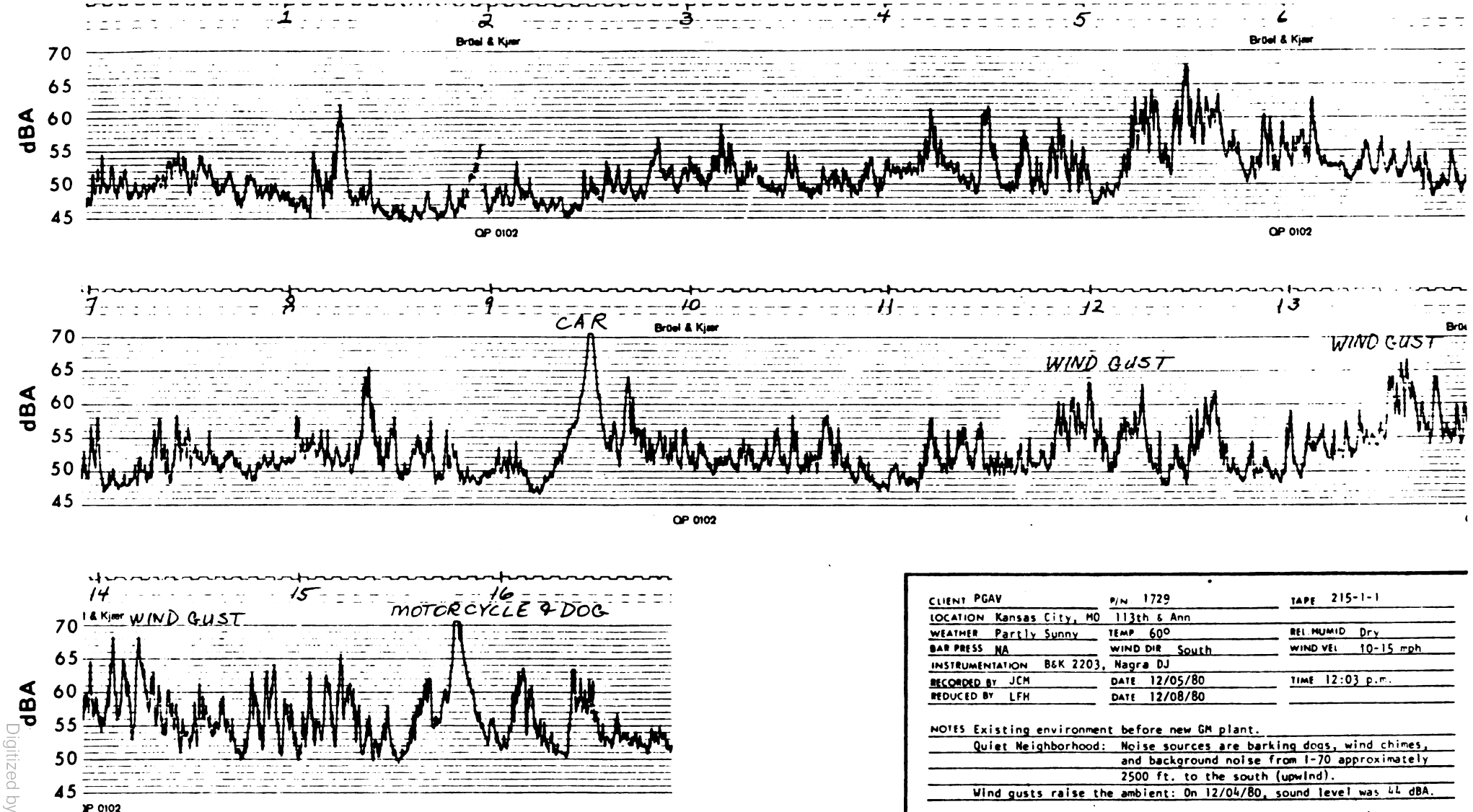


Figure B-3 Time History Plot of Tape Recording at Site 3 - 113th & Ann, Kansas City, KS

CLIENT PGAV	P/N 1729	TAPE 215-1-1
LOCATION Kansas City, MO 113th & Ann		
WEATHER Partly Sunny	TEMP 60°	REL HUMID Dry
BAR PRESS NA	WIND DIR South	WIND VEL 10-15 mph
INSTRUMENTATION B&K 2203, Nagra DJ		
RECORDED BY JCM	DATE 12/05/80	TIME 12:03 p.m.
REDUCED BY LFH	DATE 12/08/80	

NOTES Existing environment before new GM plant.
Quiet Neighborhood: Noise sources are barking dogs, wind chimes, and background noise from I-70 approximately 2500 ft. to the south (upwind).
Wind gusts raise the ambient: On 12/04/80, sound level was 44 dBA.

L_{10}=58.6 L_{50}=52.8 L_{90}=48.0 L_{eq}=55.6

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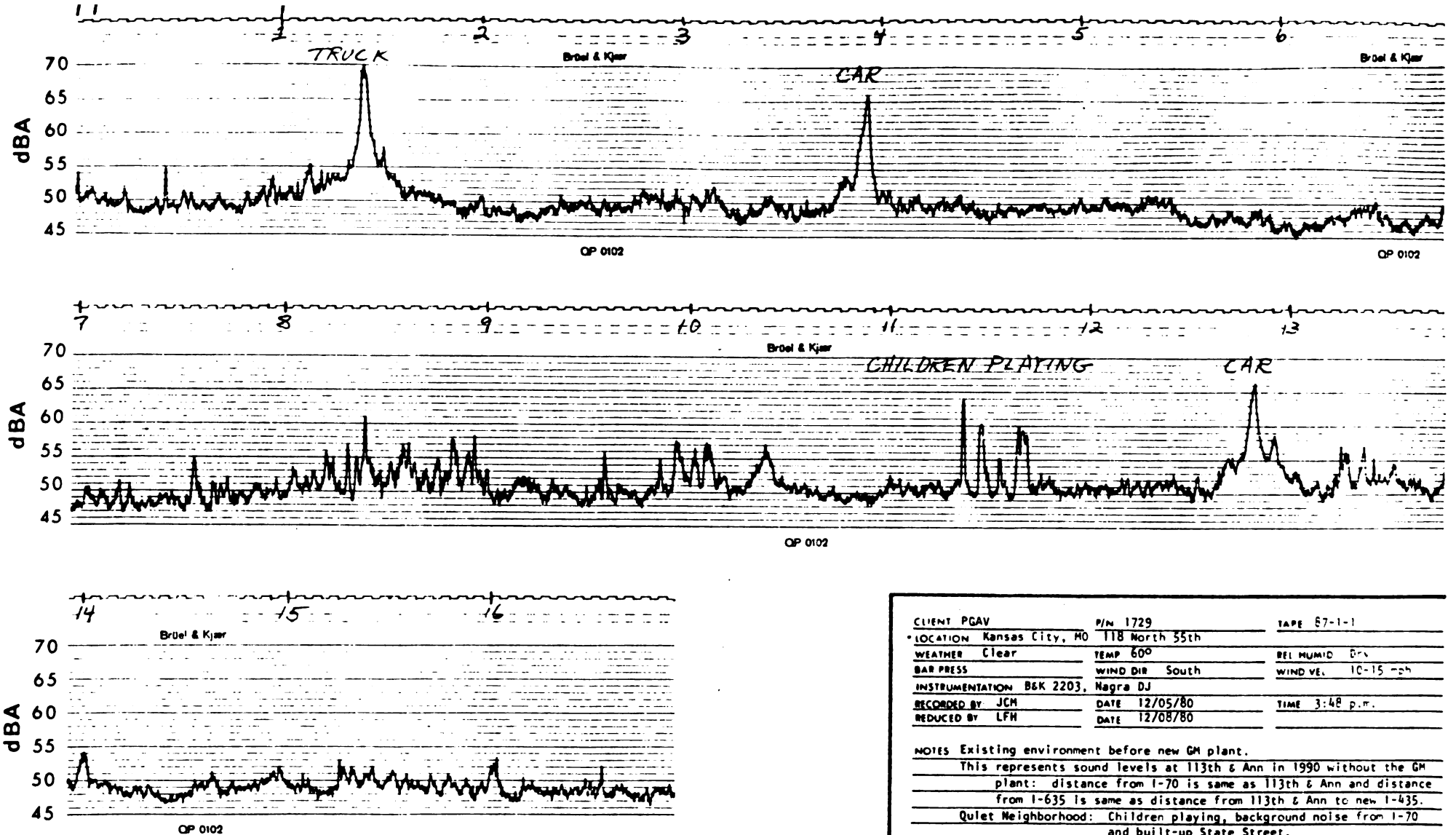

CLIENT PGAV	P/N 1729	TAPE 87-1-1	
LOCATION Kansas City, MO	118 North 55th		
WEATHER Clear	TEMP 60°	REL HUMID Dry	
BAR PRESS	WIND DIR South	WIND VEL 10-15 mph	
INSTRUMENTATION B&K 2203, Nagra DJ			
RECORDED BY JCM	DATE 12/05/80	TIME 3:48 p.m.	
REDUCED BY LFH	DATE 12/08/80		

NOTES Existing environment before new GM plant.
This represents sound levels at 113th & Ann in 1990 without the GM plant: distance from I-70 is same as 113th & Ann and distance from I-635 is same as distance from 113th & Ann to new I-435.
Quiet Neighborhood: Children playing, background noise from I-70 and built-up State Street.

L_{10}=53.0 L_{50}=50.1 L_{90}=47.6 L_{eq}=51.6

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Figure B-4 Time History Plot of Tape Recording at Site 5 - 118th North 55th Street, Kansas City, KS

be constructed around the cemetery from stockpiled soil. This berm will be eight feet high as viewed from the cemetery side of the berm and 23 feet high from the plant site side next to the marshalling yard.

Utilities:

Since the sewer lines have up to 96-inch diameter pipe, scrapers will be used to dig out the sewer trenches. This utility phase is characterized by digging the sewer trenches, placing the sewer pipe and then tamping and compacting the fill dirt around the pipe.

Foundation:

In Kansas City, Kansas, pile drivers will not be used. Instead, approximately 1,800 cassons will be constructed using drill rigs and augers.

A batch plant could possibly be constructed in the area by one of the sub-contractors; however, the batch plant is outside the scope of this analysis. Since a plenum will be constructed under the floor of the GM assembly plant, approximately 30,000 tons of concrete will be needed for this phase of construction. This implies considerable concrete truck and cement pump activity.

Above Grade Construction:

The method of building the above grade construction is to use impact wrenches to bolt the steel frame construction together. Other noises during this construction could be 10 to 20 dump trucks to support the steel contractor. Also, it has been experienced at other plants that the equipment does not arrive on schedule. The solution to placing equipment on the roof of the semi-finished building has been to use heavy lift helicopters. During construction of recent plants, heavy lift helicopters have been used up to seven weekends.

Landscaping:

During the landscaping phase, approximately ten acres of concrete paving will be placed for sidewalks, etc. There will be a lot of activity of concrete trucks as well as asphalt trucks throughout this phase. It is anticipated that the parking lot will be put in place early in the construction with the landscaping lasting until the end.

Sound Levels Due to GM Plant Operations

This section introduction will predict sound levels in the vicinity of the study area in the year 1990 with the presence of the proposed GM assembly plant. Two areas have been studied in this context. The first of these areas are those locations in the immediate vicinity of the proposed GM plant. The other study area is approximately four miles north of the proposed GM plant where a monitor was placed to characterize the present environment (this site is characteristic of sites adjacent to the proposed rail spur built to support the proposed GM plant).

TABLE B-2

Input Data for Construction Site Noise: Demolition, Rough Ground Clearing and Excavation

Duration of this Phase: Five Months

Equipment Type	Maximum Number	U.F.	dBA Sound Level at 50 foot	Relative Importance
Scraper	45	0.55	88	102
Dozer	12	0.40	88	95
Grader	8	0.08	85	83
Water Truck	8	0.55	92	98
Compactor, etc.	6	0.60	82	88
Loader, etc.	5	0.15	82	81

TABLE B-3

Input Data for Construction Site Noise: Utilities

Duration of this Phase: Twelve Months

Equipment Type	Maximum Number	U.F.	dBA Sound Level at 50 foot	Relative Importance
Scraper	1	0.60	88	86
Backhoe	2	0.20	85	81
Dozer, etc.	3	0.30	87	87
Pumps	6	1.00	76	84
Compactor, etc.	3	0.20	82	80
Cranes	2	0.20	83	79

TABLE B-4

Input Data for Construction Site Noise: Foundation

Duration of this Phase: Six Months

Equipment Type	Maximum Number	U.F.	dBA Sound Level at 50 foot	Relative Importance
Grader	1	0.10	85	75
Tractor	4	0.50	80	83
Tamper, etc.	6	0.50	76	81
Drill Rig	8	0.60	78	85
Concrete Truck	10	0.15	85	87
Crane	5	0.20	83	83
Concrete Pump	5	0.50	82	87
Backhoe	3	0.20	85	83

TABLE B-5

Input Data for Construction Site Noise: Above Grade

Duration of this Phase: Ten Months

Equipment Type	Maximum Number	U.F.	dBA Sound Level at 50 foot	Relative Importance
Impact Wrench	30	0.5	85	97
Dump Truck	10	0.2	88	91
Welding Machine	2	1.0	75	68
Crane	8	0.2	88	90
Compressor	10	0.4	81	87
Helicopter*	1	0.1	96	86*

* For up to seven weekends during construction.

TABLE B-6

Input Data for Construction Site Noise: Landscaping/Parking Lot

Duration of this Phase: Five Months at Full Speed

Equipment Type	Maximum Number	U.F.	dBA Sound Level at 50 foot	Relative Importance
Tractor	3	0.2	80	78
Backhoe	2	0.2	85	81
Concrete Truck	10	0.1	85	85
Asphalt Truck	20	0.2	88	94
Dump Truck	5	0.2	88	88

For those locations in the vicinity of the proposed GM plant itself, the future noise environment will be dominated by:

1. The GM assembly plant operations--these operations can be broken into two different classes: steady state operations and transient operations.

2. Traffic noise in the area due to increased traffic along the major arteries as well as that due to shift changes.

3. Rail operations--these operations are also broken into two classes: those due to the GM plant itself and those operations that can be expected to use the rail spur since it is in the area (the rail operations which occur on GM property will be analyzed in 1. above.)

The objectives of this section are as follows:

1. To present the method of analysis used in the prediction of the sound levels due to the presence of the proposed GM plant;

2. To present the predicted sound levels in the year 1990 with the presence of the proposed GM plant;

3. To compare these predicted sound levels with the appropriate noise criteria; and

4. To suggest appropriate noise mitigation methods for those areas where sound levels are greater than the appropriate criteria.

As stated above, the sound levels from the GM plant itself can be broken into two different classes, steady state noise which continues much the same way throughout the day and brief transient events which would add to these steady state values.

Significant steady state noise emitters are listed below:

1. Powerhouse activities: These activities include ash handling systems, boiler stacks, steam vents, air compression intakes and dust collectors.

2. Paint booth exhaust systmes: These systems include drive motors, blowers and exhaust stacks.

3. Water cooler towers: These towers include fans and water cascade devices.

4. Electrical substation.

5. Water treatment facility.

6. Miscellaneous dust collectors, roof exhausts and vacuum pumps.

Transient events that would add to the above-mentioned steady state noise emitters are as follows:

1. Coal car shake-out.

2. Coal pile front end loader.

3. Railroad activity associated with material deliveries to the plant, occurring once each shift.

4. Railroad activity in the automobile shipping area.

5. One road car hauler (truck) activity associated with the tri-level shipping area.

6. Truck activity associated with the receiving area.

7. Employee vehicular traffic associated with shift changes.

Figure B-5 shows the location of the measurement sites that were used at the Oklahoma City plant and Table B-7 has been adapted from their report to predict noise levels in the vicinity of the proposed General Motors Assembly Plant in Kansas City, Kansas. Those sites marked with a P lie on the property line of the plant. Those marked with an R have been chosen close to rail operations. The sound levels range from the low of 46 dBA at Site P5 to a high of 51 dBA at Site P2.

Predicting the Combined Sound Levels Due to Transient Operations Added to Steady State Operations:

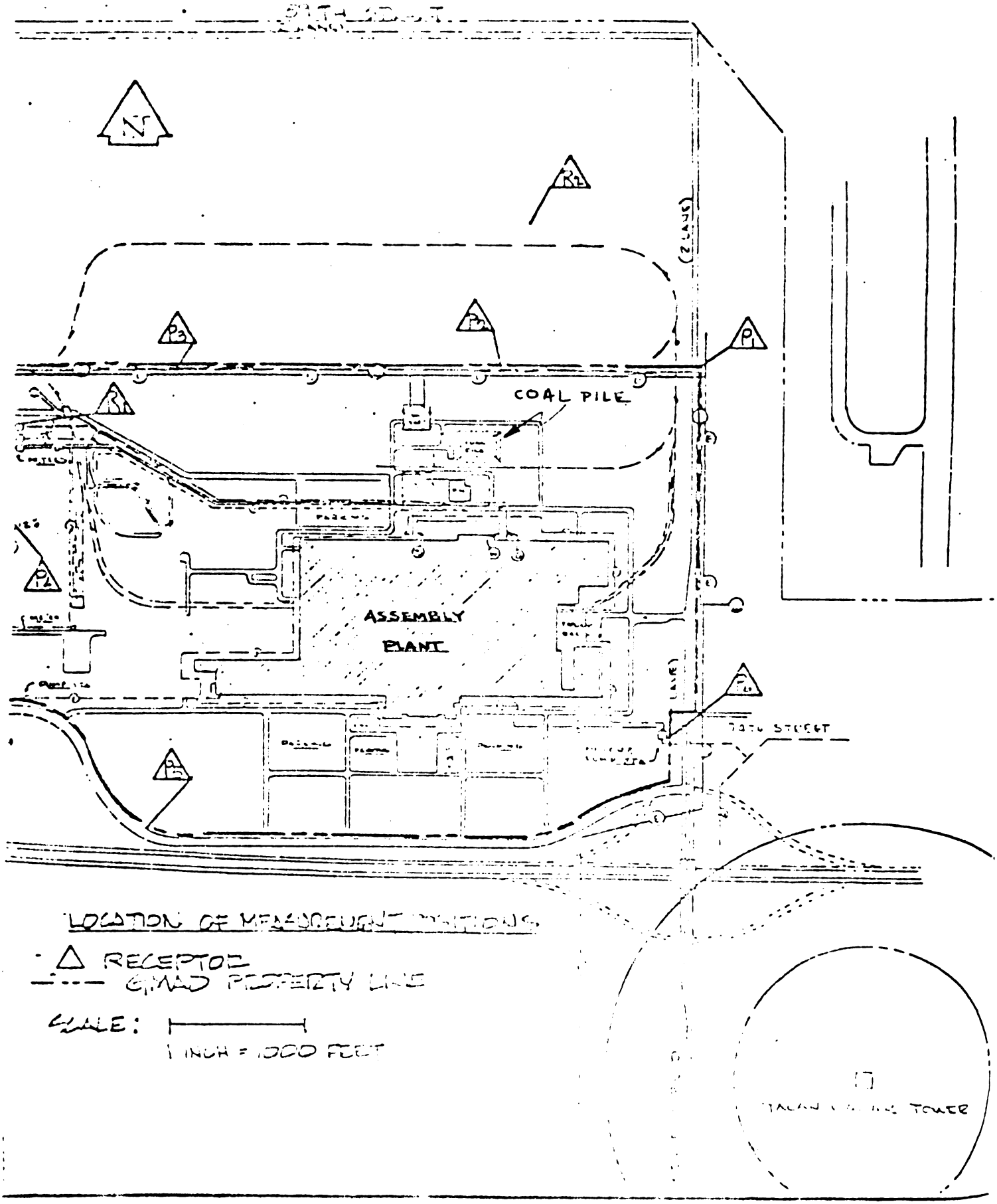
To predict the sound levels in the vicinity of the proposed General Motors plant due to the combination of steady state sound as well as transient activities, an EDI proprietary computer program MSRAN (Multiple Source Receiver ANalysis) was used. The model was based on the data acquired during discussions with Roger Menke of General Motors, from traffic data obtained by Civic Systems, Inc. for this project, and from the project description. Figure B-6 presents the property line L_{dn} values that result from this analysis.

Assumptions:

The following assumptions were used to predict future noise levels due to the combination of all plant operations:

1. Stationary plant equipment and activities will be similar to the Oklahoma City facility.

2. Operations will occur over two shifts.



LOCATION OF MEASUREMENT POSITIONS

△ RECEPTOR

---- GMAD PROPERTY LINE

SCALE: ——— 1 INCH = 1000 FEET

[illegible] TOWER

[illegible] ASSEMBLY PLANT

TABLE B-7

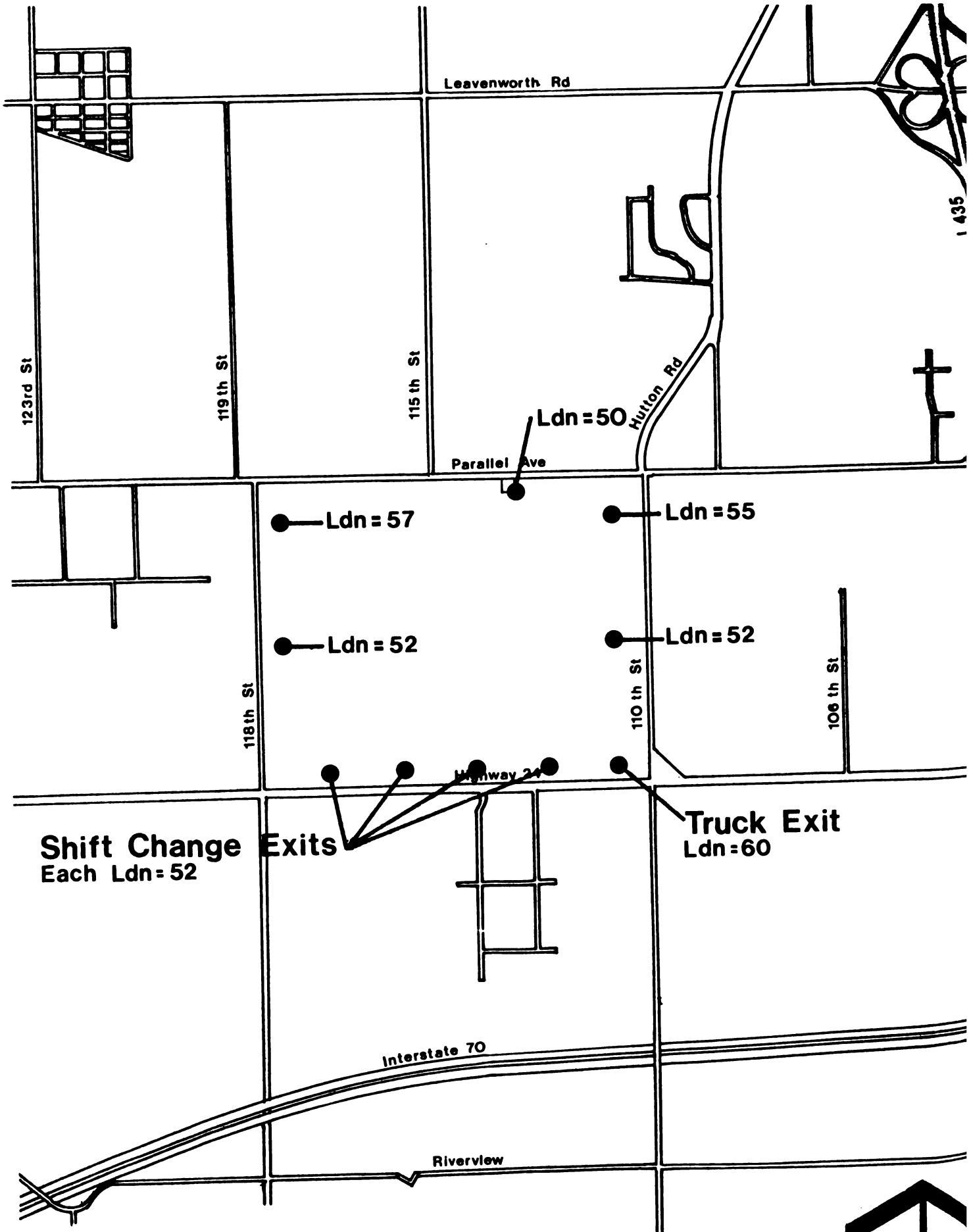
Noise Levels at the Present General Motors

Assembly Plant, Oklahoma City, Oklahoma*

Site	L_{eq} (24)**
P1	50
P2	51
P3	49
P4	48
P5	46
P6	47
R1	48
R2	46

* Adapted from Total Environmental Systems, Inc. Report to General Motors, April 25, 1980

** Steady-state plant operations excluding train activities, vehicular noise and coal car shake-out.



Sound Levels Due To GM Plant Activities Alone

10-32

Figure B-6

3. Railroad activity consists of:

   a. Trains bringing materials into the facility on the north and south sides once each shift (5:00 A.M. to 6:00 A.M. and 2:30 P.M. to 4:30 P.M.), typically consisting of 65 cars per day.

   b. The tri-level shipping area tracks will be set up by 7:00 A.M. and again by 4:00 P.M. consisting of 24 cars per shift.

   c. Coal car traffic will not be greater than 20 cars per day at the beginning of operations, reducing to 10 cars per day after three months of General Motors operations.

   d. Switching and other train make-up activities will occur on General Motors' property.

4. On-road vehicle activity consists of:

   a. Car haulers will not exceed 100 trucks per day.

   b. Car haulers access State Avenue directly.

   c. Receiving area truck traffic averages 25-35 trucks per day, accessing via State Avenue.

   d. Employee vehicle traffic of approximately 3,157 cars arrives from State Avenue to the employee parking lot at the start of each shift over a one-hour period. (Table B-8)

5. Coal car shake-out averages a maximum of 30 seconds per car with no more than 10 cars per day. The shake-out will be enclosed in a steel shell enclosure similar to that observed at the Oklahoma facility. A coal car warming facility will be available for cold weather operations.

6. An earthen berm will be constructed along the north property line between five and ten feet above grade to shield the church and cemetery. The berm is 25 feet above grade when viewed from the plant side. (The rail marshalling yard is 15 feet below the cemetery elevation.)

Sound Levels Due to Traffic Noise

In the year 1990 with the proposed General Motors plant, traffic noise will impact the area from the following traffic arteries: I-70 and State Avenue, both during shift changes as well as from increased volume in general. Interstate 435 is too far from the study area to add to the level of noise.

Table B-9 contains traffic flow volume data obtained from Figures B-7 and B-8. These traffic flow rates and other parameters were used in EDI's proprietary computer program HIWAY to predict sound levels in the study area due to traffic along the traffic arteries in question.

TABLE B-8

MAXIMUM TRIP GENERATION
"WORST CASE" CONDITIONS

Shift 1

6:00 A.M. to 2:30 P.M.

2,700 Labor
457 Supervisory

3,157 Work Force x 3 Trips/Employee** = 9,471 Trips

Shift 2

3:30 P.M. to 12:00 Midnight

2,482 Labor
191 Supervisory

2,673 Work Force x 1.75 Trips/Employee = 4,678 Trips

Shift 3

11:00 P.M. to 7:00 A.M.

144 Labor
26 Supervisory

170 Work Force x 1 Trip/Employee = 170 Trips

14,319 Subtotal

175 Truck Haulage

14,494 TOTAL TRIPS

Call 14,500 Trips Generated

**SOURCE: ITE Trip Generation Handbook

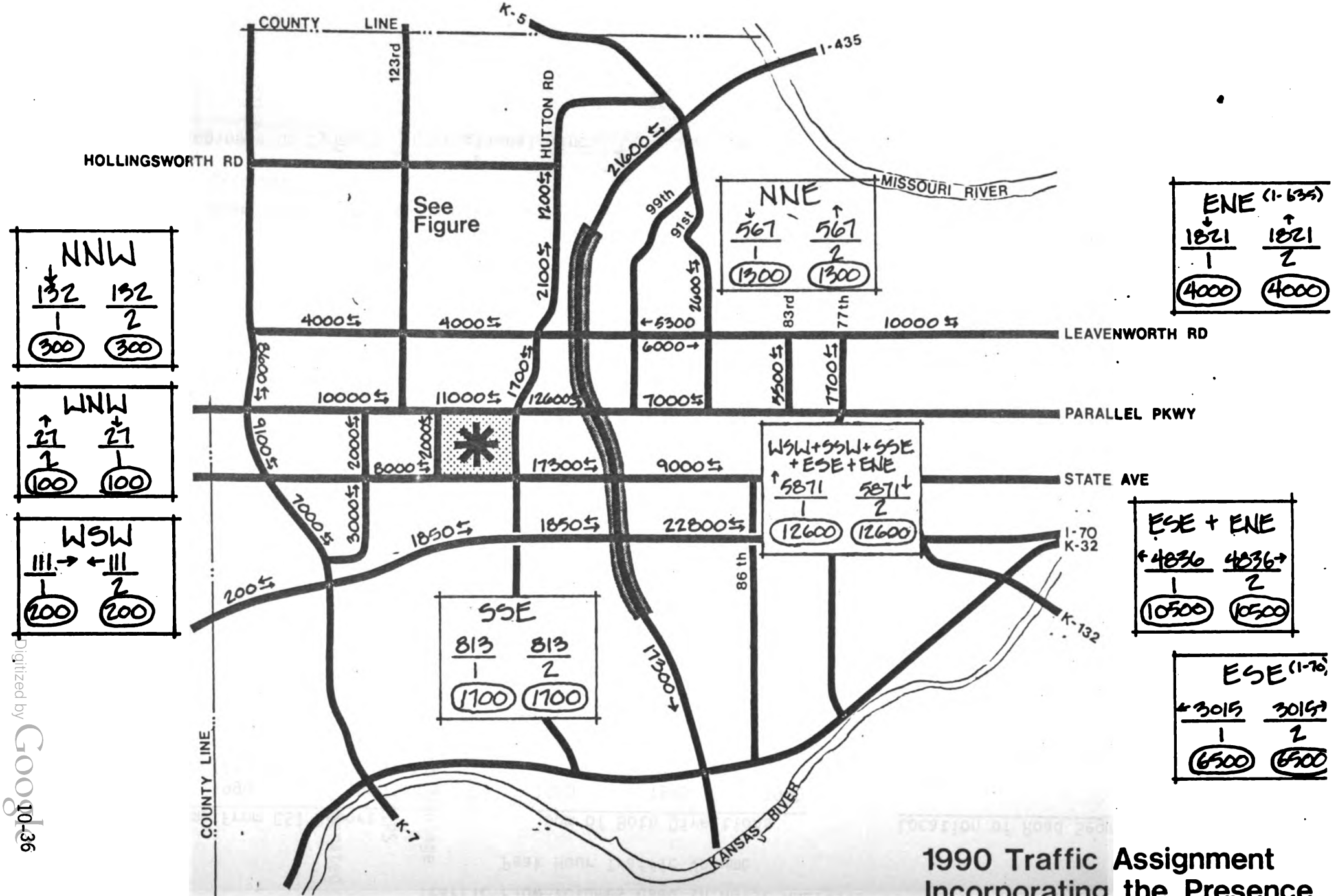
Traffic Flow Volumes Used In Noise Analysis

Peak Hour Traffic Volume

Traffic Volume From CSI Report			Sum of Both Directions			Location of Road Segment
1980 (Fig. 1)[1]	1990 (Fig. 2)[2]	1990 w/GM (Fig. 4)[2]	1980	1990	1990	
11600	10200 ≻ / 1000 ≺	18500 ≻ / 1850 ≺	700	1200	2200	I-70 South of Project
13900	1390 ≻ / 1400 ≺	17300 ≻ / 1730 ≺	850	1680	2000	State Street East of Project
7000	2500 ≻ / 300 ≺	11000 ≻ / 1100 ≺	420	1100[4]	1300	Parallel Avenue North of Project
N/A	11300 ≻ / 1100 ≺	20100 / 5900 NB, 19400 / 5900 SB	N/A	1300	7500	I-435 East of Project
1465	1200 ≻ / 100 ≺	1200 ≻ / 100 ≺	90	120	120	Hutton Road 4 Miles North of Project

Notes:
1. This traffic flow volume is total for both directions.
2. This traffic flow volume is for one direction only. To determine total ADT flow per road segment, multiply ADT (top number) by 2.
3. Peak hour traffic volume equals peak hour on one lane plus twenty percent on other lane (cannot have peak flow in both directions at once).
4. Estimated.

SOURCE: Engineering Dynamics International, Inc.; December, 1980.



24 Hr. ADT's
Peak Hr. Traffic Volumes projected as 10%

1990 Traffic Assignment Incorporating the Presence of the GM Assembly Plant

Figure B-7

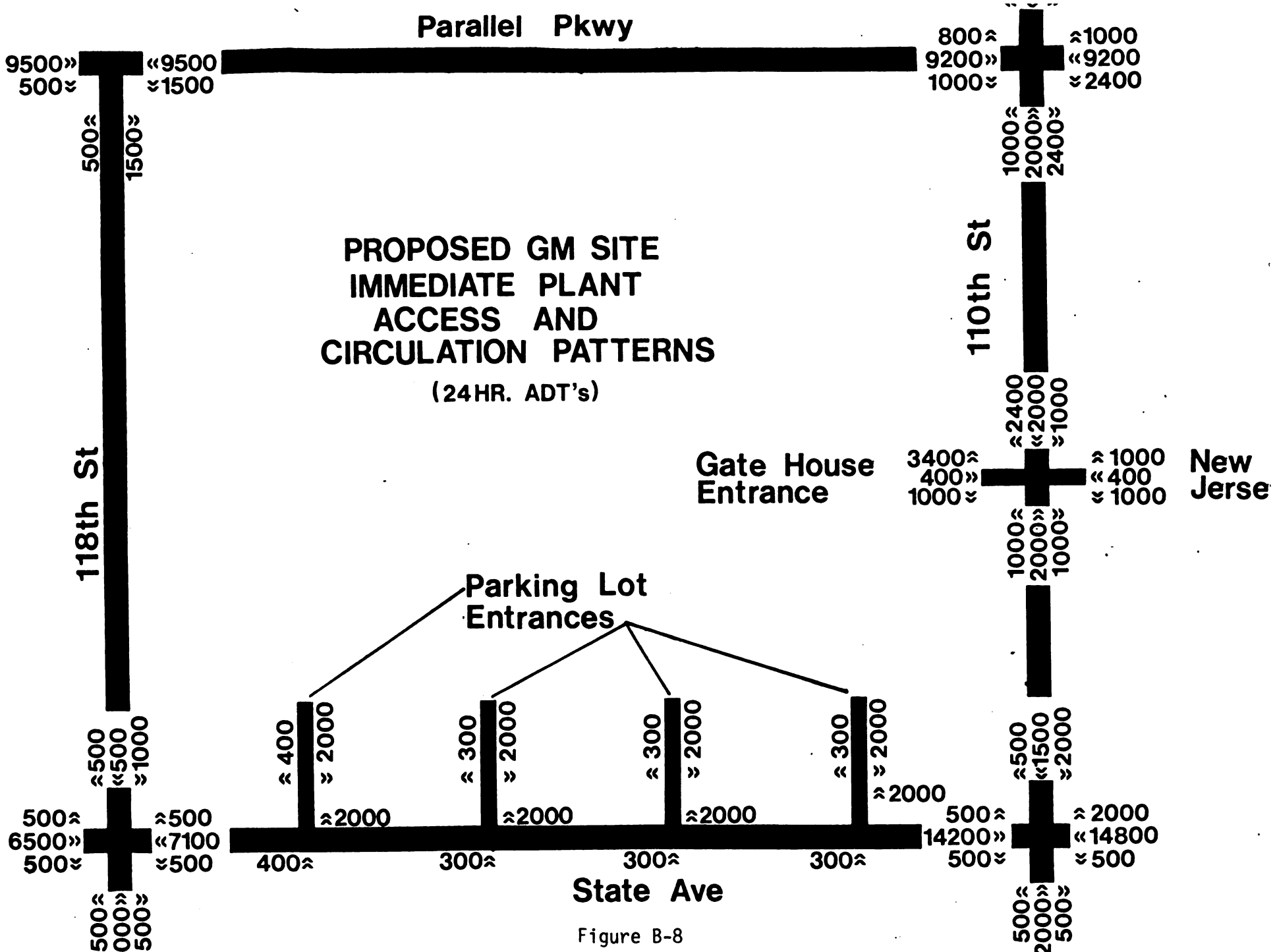


Figure B-8

Table B-10 presents the distance to noise contour lines of each of these traffic arteries and Figure B-9 shows the resulting noise contours due to all traffic arteries.

Rail Operations

This section analyzes the noise impact of rail operations along the spur between the General Motors plant and the Wolcott railyards. (Rail operations on the General Motors property were discussed with the General Motors plant site earlier.) Maximum rail oeprations due to the General Motors plant along the spur will be four two-way trips per day. The time of arrival at the General Motors plant of the coal cars or supply cars cannot be exactly determined at this time, however, the following tentative schedule from Section 6 is used. Missouri Pacific would have one maximum 65-car road train arrive at the plant at about 1:00 A.M. This locomotive equipment and caboose would then leave as an outbound main line train with a maximum of 65 cars at about 5:00 A.M. A second main line train of 65 cars should arrive at the plant about 12:00 noon, and this locomotive and caboose, with a maximum of 65 outbound cars, would leave at approximately 8:00 P.M.

In addition, there would be a transfer train with a maximum of 25 cars out of Kansas City arrive at the plant at approximately 9:00 A.M. and leave the plant with a maximum of 25 cars about 11:00 A.M. A second transfer train with a maximum of 25 cars out of Kansas City would arrive at the plant at approximately 6:00 P.M. and leave the plant with a maximum of 25 cars at about 8:30 P.M. Table B-11 summarizes the expected rail operations as well as EDI's estimate of the distance to the L_{eq} (16) sound level contours.

Residences in the Old Piper area will not be exposed to noise levels greater than 55 dB L_{eq} (16) because a natural hill (20 feet in elevation) shields the subdivision from rail noises to the north and a 40-foot cut for the rail right-of-way shields the residential area closest to Piper.

Residences in the Countryview Lake Subdivision will not be exposed to noise levels greater than 55 dB L_{eq} (16) since the closest houses are at least 600 feet from the rail and are shielded from noise by a 70-foot natural hill. Other houses in the subdivision are partially shielded from rail noise by topography, dense vegetation, and even greater distances from the rail track.

No other housing areas will be exposed to rail noise higher than 55 dBA, consequently, no map is necessary to illustrate this situation.

Noise Environment Documentation

This section uses the method suggested in "Guidelines for Preparing Environmental Impact Statements on Noise" contined in a 1977 draft report of CHABA Working Group 69 (Appendix D). This method breaks the noise field into ranges of sound level and documents the present amount of people in the different noise zones and compares them with future people and land area in

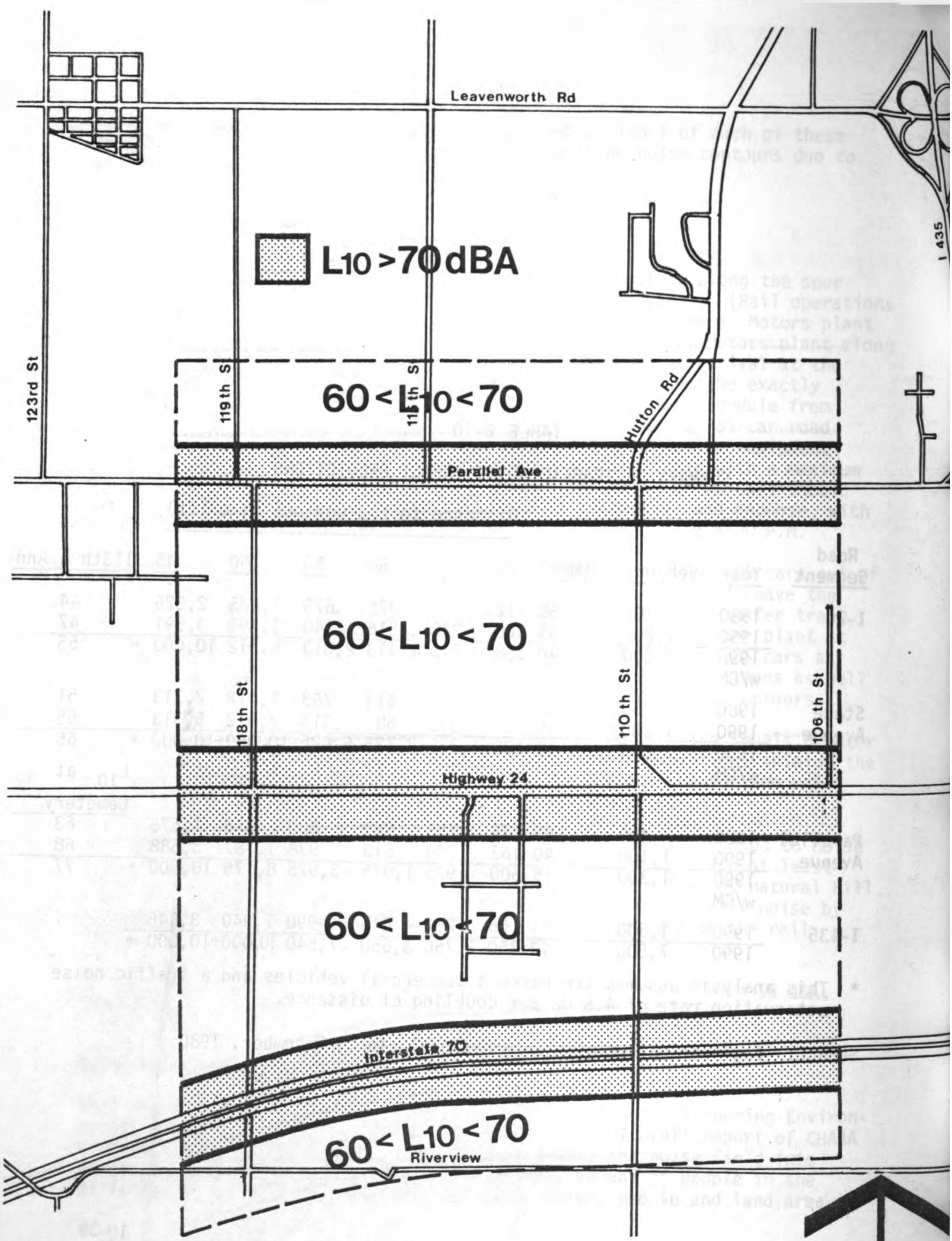
TABLE B-10

SUMMARY OF TRAFFIC NOISE IMPACT PREDICTIONS

Road Segment	Year	Veh/Hr.	(MPH)	Distance to L_{10} Contour Line (ft) 70	65	60	55	50	45	113th & Ann
I-70	1980	700	55	112	212	375	675	1,225	2,325	44
	1990	1,200	55	160	278	516	940	1,790	3,591	47
	1990 w/GM	2,200	40	388	713	1,413	2,813	5,512	10,000 +	55
State Avenue	1980	850	55	131	238	413	763	1,412	2,713	51
	1990	1,680	40	206	375	688	1,313	2,612	5,313	55
	1990 w/GM	2,000	15	675	1,325	2,725	5,625	10,000+	10,000 +	65
										L_{10} at Cemetery
Parallel Avenue	1980	420	45	75	156	288	500	875	1,575	63
	1990	1,100	40	163	288	513	938	1,787	3,588	68
	1990 w/GM	1,300	15	500	975	1,975	3,975	8,175	10,000 +	77
I-435	1990	1,300	55	166	291	541	990	1,940	3,846	
	1990	7,500	40	850	1,750	3,650	7,540	10,000+	10,000 +	

* This analysis assumes ten percent commercial vehicles and a traffic noise attenuation rate of 4.5 dB per doubling of distance.

SOURCE: Engineering Dynamics International, Inc.; December, 1980.



Traffic Noise Impact: 1990 With GM

Figure B-9

TABLE B-11

RAIL OPERATIONS

Location	No. Operations Per Day	Distance from L_{eq} (16) to Track Centerline(ft) 55	60	65	
Rail spur	8	400	200	85	GM operations
Rail spur	20	700	330	170	GM plus spin-off rail spur activities
Siding Operations	45	1,200	600	300	No barriers
Siding Operations	45	500	240	100	25' berm as* viewed from rail yard side.

* Earth berm placed as close to tracks as possible. Twenty-Five foot high from rail side, 10-foot high from residentail side.

the noise zones. Since the noise impact of the proposed General Motors Assembly Plant is dominated by traffic noise, the Noise Environment Documentation has been prepared for traffic noise alone (Table B-12). (Expected sound levels at the General Motors property lines can be seen on Figure B-6. All property line sound levels are less than 60 L_{dn}, therefore no complaints are expected due to the noise of the assembly plant operations.) Table B-12 summarizes this noise environment documentation. Since the area in question is characterized by a rural/semi-rural environment, the lower limit of this analysis has been extended to those sound levels below L_{10} = 60 dBA.

The number of existing houses exposed to various noise levels varies over time and with regard to future action taken. One-hundred and fifty-five houses would be exposed to L_{10} levels less than 60 dBA in 1980 and 1990 without General Motors. This number drops to zero with implementation of the project, indicating all houses within the noise study area would experience sound levels in excess of 60 dBA, a significant increase over present levels.

Noise contours developed for 1980 (Figure B-10) and 1990 without General Motors (Figure B-11) demonstrate significant increases in the number of houses exposed to L_{10} levels above 70 dBA; this change is a result of higher traffic volumes introduced by I-435. However, in 1990 with General Motors (Figure B-12) this number almost doubles the 1990 figure without General Motors, indicating that 37 percent of houses in the noise study area would be exposed to these higher noise levels (Table B-12).

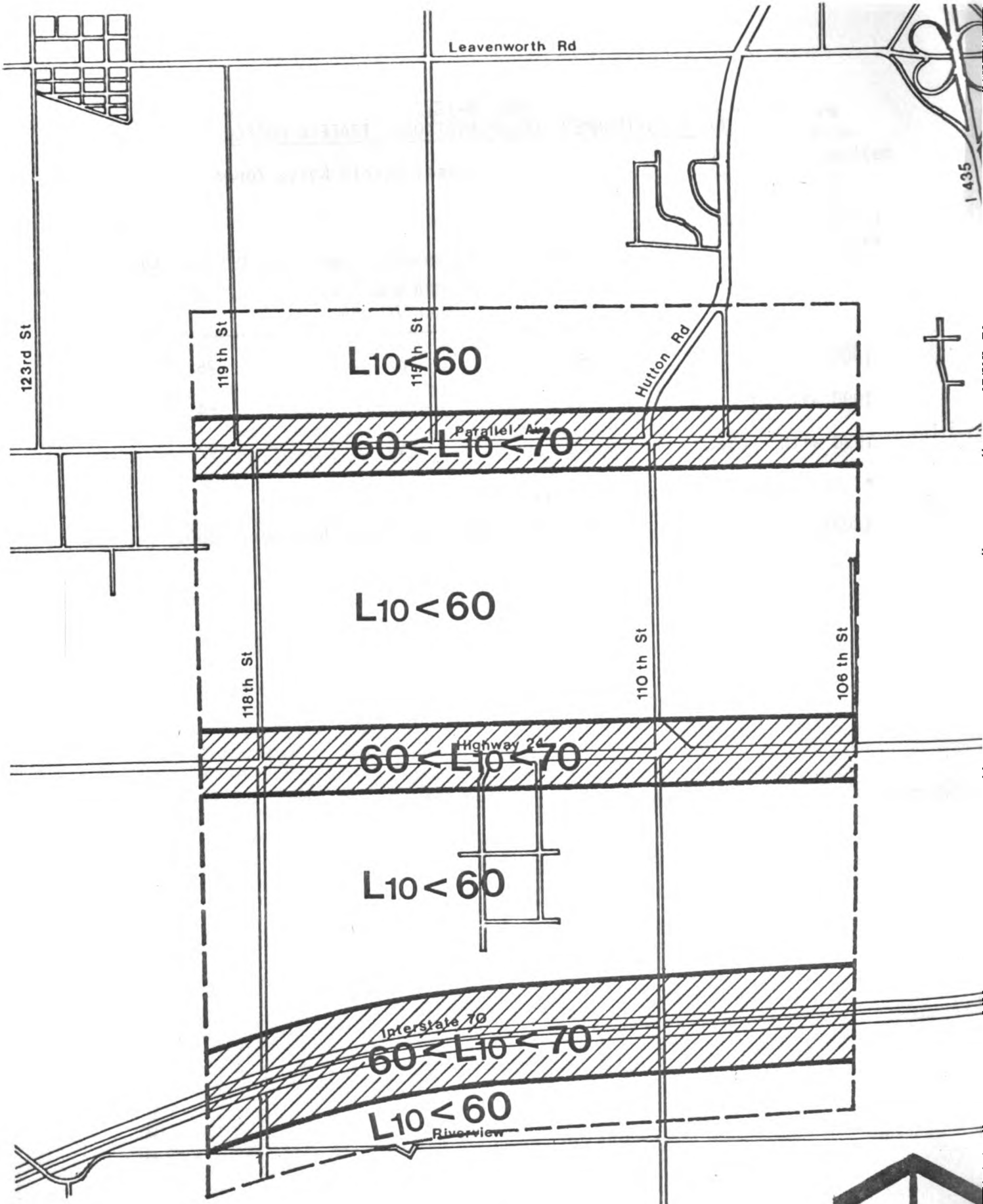
For the year 1980 and the year 1990 without the General Motors project, the noise environment is dominated by traffic noise from I-70 and from the major arteries of State Avenue and Parallel Parkway. Those houses within 200 yards of State Avenue and Parallel Parkway can expect some change in impact from 1980 to 1990 as the traffic flow volume on these streets increases. Other residents in the study area should perceive no increase in sound levels (Figure B-
Sound levels during construction will increase to 60 L_{dn} for those residences within one-half mile of the project boundary. These sound levels will reduce after construction, yielding an L_{dn} 60 value at the boundary of the General Motors site.

TABLE B-12
NOISE ENVIRONMENT DOCUMENTATION: TRAFFIC NOISE

	Houses Within Noise Zones		
	L_{10} less than 60 dBA	L_{10} greater than 60 dBA and less than 70 dBA	L_{10} greater than 70 dBA
1980	155	67	25
1990 without Project	155	38	54
1990 with Project	0*	155	92

* By EDI definition of study area.

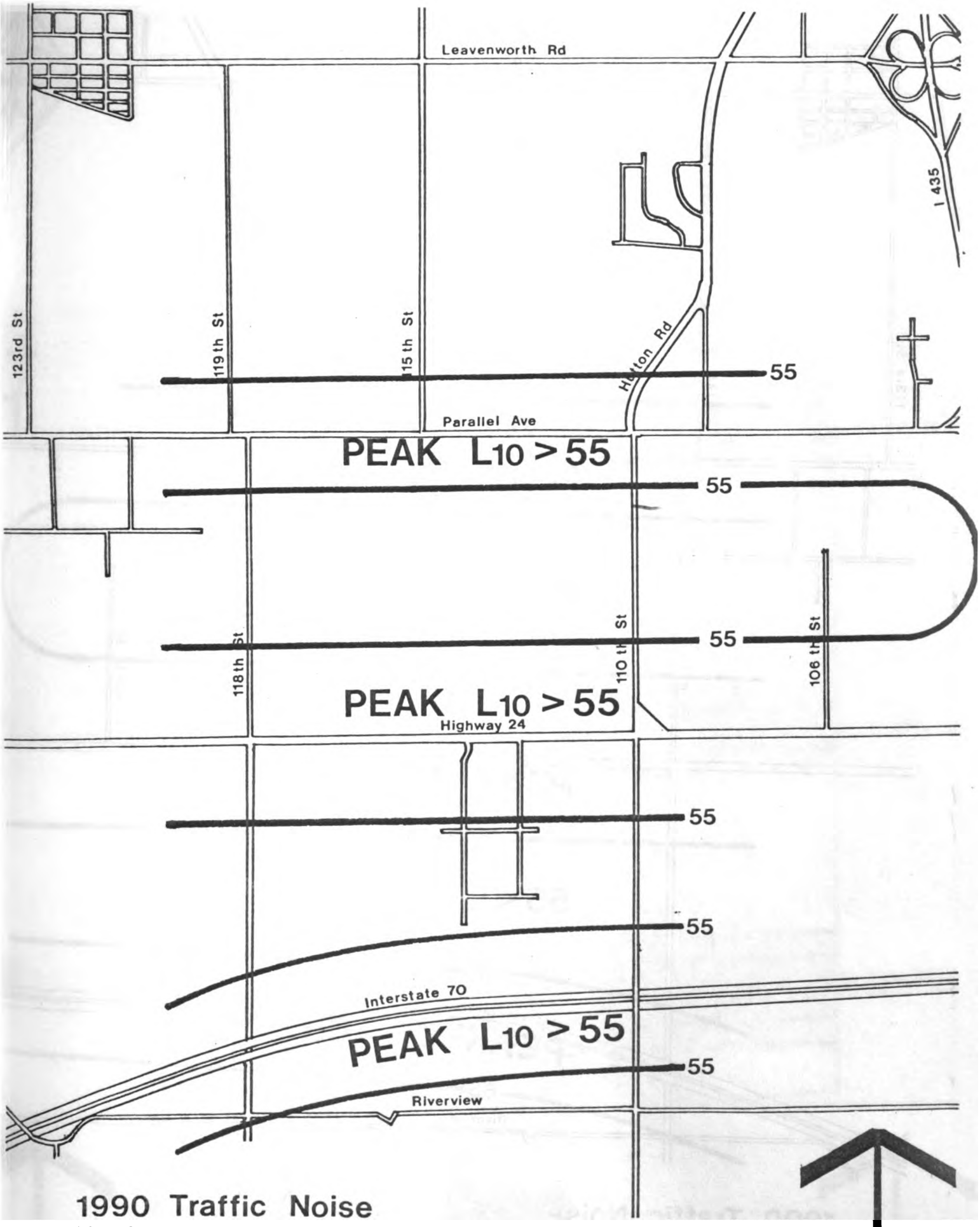
SOURCE: Engineering Dynamics International, Inc.; December, 1980.



Traffic Noise Impact: 1980

Figure B-10

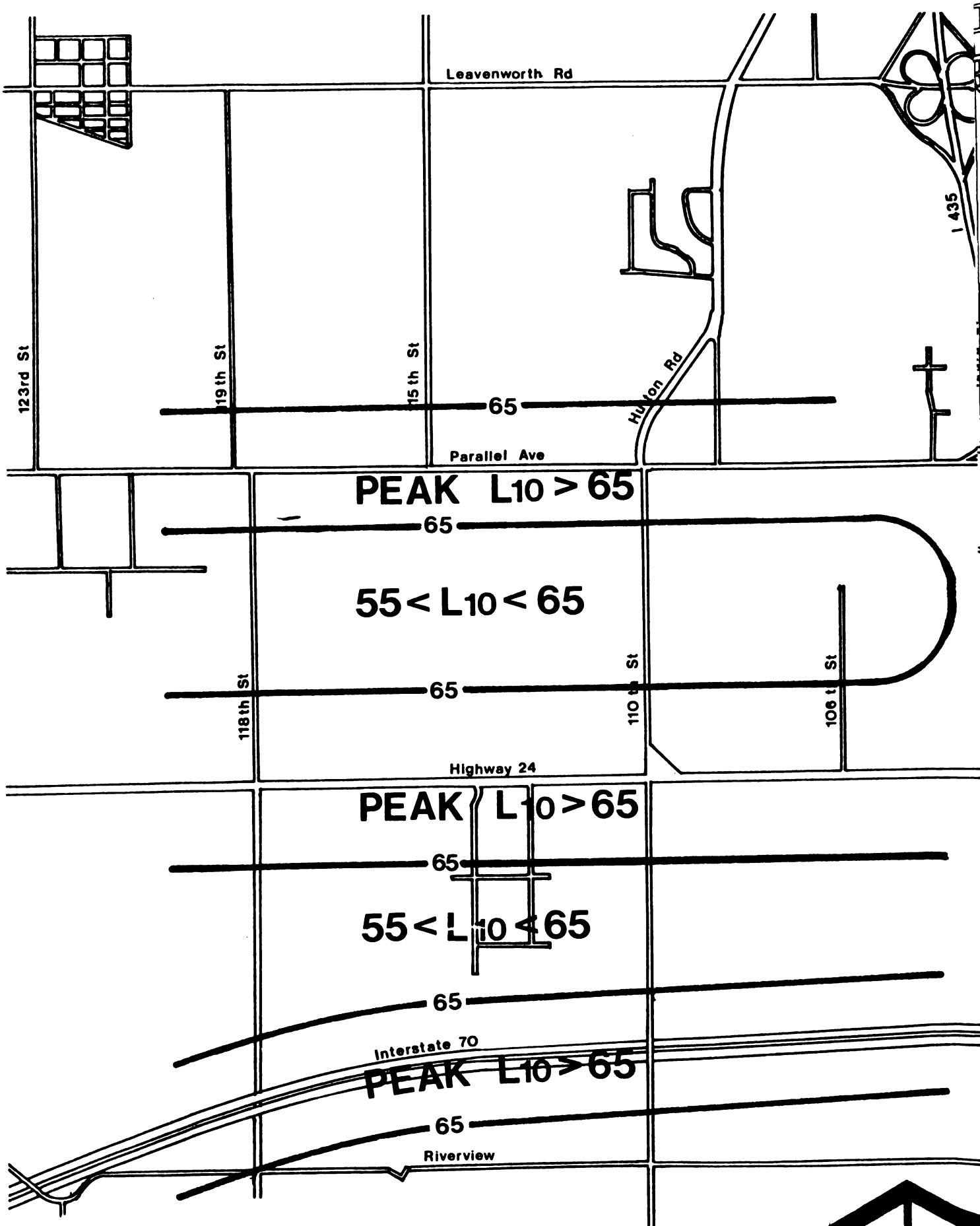
0 2000 4000 6000 8000



1990 Traffic Noise
Without Project

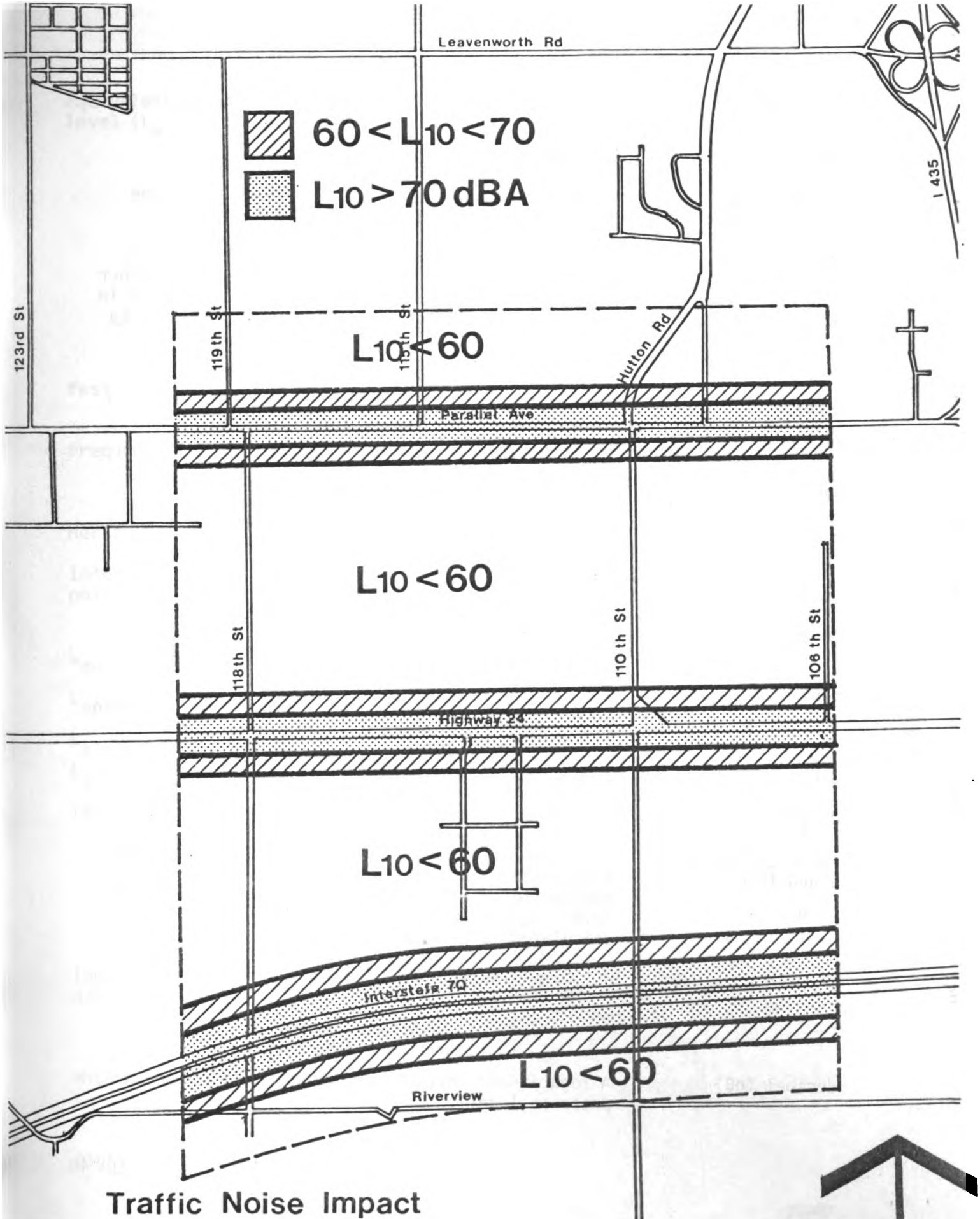
Figure B-11

0 2000 4000 6000 8000



1990 Traffic Noise With Project

Figure B-12



Traffic Noise Impact
1990 Without GM
Figure B-13

0 2000 4000 6000 8000

Definitions of Acoustical Terms

A.N.S.I.	American National Standards Institute.
audible range (of frequency)	The normal frequency of human hearing, i.e., the frequency range 16 Hz to 20,000 Hz (20 kHz).
A-weighting	Prescribed frequency response defined by A.N.S.I. Standard S1.4-1971. Used to obtain a single number representing the sound pressure level of a noise in a manner approximating the response of the ear, by de-emphasizing the effects of the low and high frequencies.
A-weighted sound level, A-level (AL)	A quantity, in decibels, read from a standard sound-level meter with A-weighting circuitry.
ASEL	A-weighted sound exposure level (see SEL).
C-weighting	Prescribed frequency response defined by A.N.S.I. Standard S1.4-1971. Slightly de-emphasizes low- and high-frequency ranges.
C-weighted sound level, C-level (CL)	A quantity, in decibels, read from a standard sound level meter with C-weighting circuitry.
continuous noise	On-going noise whose intensity remains at a measurable level (which may vary) without interruption over a specified period of time.
CSEL	C-weighted sound exposure level (see SEL).
daytime	The hours 0700 to 2200.
day-night average sound level (L_{dn})	A measure of the noise environment over a 24-hour A-weighted sound level with a 10-dB weighting applied to the nighttime levels. When equivalent level (L_{eq}) information is available, the L_{dn} is calculated as follows: $$L_{dn} = 10 \log_{10} \frac{1}{24} [(15)\, 10^{L_d/10} + (9)\, 10^{L_n + 10/10}] \text{ dB}$$ where $L_d = L_{eq}$ for the hours 0700-2200, $L_n = L_{eq}$ for the hours 2200-0700.
decibel (dB)	A logarithmic unit of measure of sound (see sound pressure level).

equivalent sound level (L_{eq})	The level of a constant sound which, in a given situation and time period, has the same sound energy as a time varying sound level. While the typical averaging time for the equivalent level is a period of 1 hour, the time period can be altered to meet the user's needs. In equation form: $$L_{eq} = 10 \log_{10} \sum_{i=1}^{n} f_i 10^{L_i/10} \text{dB}$$ f_i = percent of time period in which a particular L_i occurs L_i = sound level in dB.
fast response	Dynamic characteristics of a sound level meter as defined in A.N.S.I. Standard S1.4-1971.
frequency	Number of complete oscillation cycles per unit of time. The frequency is the reciprocal of the period. The unit of frequency often used is the Hertz.
Hertz (Hz)	Unit of frequency equal to one cycle per second.
Intermittent noise	Fluctuating noise whose level falls one or more times to low or unmeasurable values during an exposure.
L_{dn}	See day-night average sound level.
L_{eq}	See equivalent sound level.
L_x, L_{10}, L_{50}, L_{90}	See statistical levels.
level (L)	The level of a quantity is the logarithm of the ration of that quantity to a reference level. In symbols $L = \log_r (q/q_0)$ r= base of logarithms q= the quantity under consideration q_0= reference level.
logarithmic addition	Combination of sound levels using the logarithmic mathematical function. In equation form: $$\log(a) + \log(b) = \log (a \cdot b)$$
microphone	An electroacoustic transducer that responds to sound waves and delivers essentially equivalent electric waves.
night	The hours 2200 to 0700.

noise	Any undesired sound.
noise level	See "sound level".
root-mean square (rms)	Square root of the arithmetical mean of the squares of a set of instantaneous amplitudes.
sampling	Transformation of a continuous function into a discrete series of values in appropriate order.
sound	An oscillation in pressure or an auditory sensation evoked by the pressure oscillation.
sound exposure level (SEL)	The total energy of a sound accumulated over a given time interval. Technically, it is the weighted sound level (A or C) integrated over the duration of a noise event.
sound level	Sound-pressure level measured in terms of a metering characteristic and weighting (A, B, or C), as specified in A.N.S.I. standard, S1.4-1971.
sound-level meter	An instrument comprising a microphone, amplifier, output meter, and frequency-weighting networks, which is used for the measurement of noise.
sound pressure	A measure of the fluctuating variations in pressure from the static value (i.e., atmospheric pressure) caused by the presence of the sound field. For most complex sound sources the sound pressure contains energy over a broad frequency range audible to humans. The sound pressure at a point is the total instantaneous pressure at that point in the presence of a sound wave minus the static pressure at that point.
sound pressure level (SPL)	In decibels, 20 times the logarithm to the base 10 of the ratio of a sound pressure to the reference sound pressure of 20 micropascals. In equation form: $SPL = 20 \log_{10} p/pr$ where p = sound pressure to be quantified, pr = 20 micropascals.
statistical levels (Lx)	The noise level which is exceeded for a stated percentage (x) of the time period of interest. L_{10} is that level exceeded 10% of the time.
steady-state sounds	Sounds whose levels remain constant in time.
transducer	A device capable of being actuated by waves from one or more transmission systems and supplying related waves to one or more other transmission systems. Examples are microphones, accelerometers, and loudspeakers.

weighting scales	Prescribed frequency response provided in a sound-level meter, to selectively discriminate against low and high frequencies in accordance with certain equal-loudness hearing characteristics of the human ear.

APPENDIX C

WATER QUALITY DATA - MISSOURI AND KANSAS RIVERS

Station: 202 Missouri River at Kansas City,Mo.,MO-366.1,SE¼,Sec.32,T50N,R33W, On Chicago,Burlington,and Quincy Railroad Bridge,½ mile north of Interstate 70,in Kansas City,Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Micrograms per Liter

Date	Time	Temp. °C	Aldrin	Dieldrin	Chlordane	DDT O,P'	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor	Atrazine	Ramrod	Alachlor	Sencor	Dacthal	PCBs	2-4,D	2,4,5 TP	Toxaphene	Trichloroethylene	Vinyl chloride		
5-7-79	11:15A	2.	LT0.025	LT0.05	LT0.12	LT0.10	LT0.10			LT.025	LT0.20	LT1.2	LT0.25	LT0.25	LT0.10	LT0.05	LT0.50	LT0.40	LT0.20	LT2.0				
4-28-80	11:24A	9.	LT.025	LT0.05	LT0.12	LT0.10	LT0.10			LT.025	LT0.20	LT1.2	LT0.25	LT0.25	LT0.10	LT0.05	LT0.50	LT0.40	LT0.20	LT2.0				

Micrograms per Liter

Date	DDT P,P'	2,4,5 T
5-7-79	LT0.10	LT0.20
4-28-80	LT0.10	LT0.20

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1, SE¼ Sec.32, T11S R33W
On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
7-11-67	9:30A	9.08	60000	24.	250.	7.9	630.	430.				220.	48.	172.	2.7					0.4	6.3							
8-23-67	8:36A	5.15	43500	24.	100.	8.0	730.	488.				238.	76.	162.	2.2		0.16			0.7	6.6	1.7				3100	47 100	2900
9-26-67	9:00A	8.63	57200	20.	1600.	8.0	450.	300.				160.	42.	118.	2.2		0.19			0.3	7.3	4.6				200000	18000	47000
10-25-67	1:10P	4.88	44600	12.	160.	7.6	730.	482.				244.	106.	138.	1.3		0.22			0.5	8.7	2.9				54000	23000	10000
12-6-67	12:05P	2.69	38900	5.	65.	8.0	750.	514.				271.	79.	192.	2.7		0.25			0.5	11.4	3.8				48000	25000	88000
1-30-68	12:10P	4.71	40100	0.	65.	8.0	780.	491.				270.	88.	182.	2.7		0.48			0.7	10.7	4.6				33000	21000	37000
2-27-68		2.54	25600	0.	35.	8.0	790.	516.				266.	74.	192.	2.7		0.67			0.6	12.2	3.2				3000	1100	17000
3-26-68		4.32	39700	8.	110.	8.1	750.	503.				246.	68.	178.	3.1		0.45			0.6	11.1	3.2				51000	6300	23000
4-30-68	12:30P	8.43	43100	16.	190.	7.8	700.	480.				254.	78.	176.	3.1		0.30			0.6	8.4	2.4				22000	2500	9800
6-11-68	2:10P	6.59	43800	25.	75.	8.2	720.	486.				242.	80.	162.	1.5		0.19			0.4	6.7	3.0				5900	3300	3900
8-6-68	1:25P	8.50	56800	26.	380.	7.9	500.	338.				170.	38.	132.	.35		0.33			1.1	5.9	3.8				160000	22000	2000
9-10-68	11:55A	5.43	40100	20.	220.	7.6	670.	460.				234.	72.	162.	2.4		0.33			0.4	7.4	2.1				69000	2000	7100

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
7-11-67	67.	13.	51.	8.0		210.	140.	21.	0.4	.18	11.																		
8-23-67	64.	19.	68.	7.2		198.	185.	22.	0.5	.19	7.8																		
9-26-67	48.	9.7	33.	6.6		144.	88.	15.	0.5	.15	8.6																		
10-25-67	70.	17.	62.	7.4		168	206.	28.	0.5	.18	9.4																		
12-6-67	74.	21.	67.	7.4	0	234.	171.	37.	0.4	.23	8.2																		
1-30-68	72.	22.	65.	7.2	0	222.	160.	42.	0.5	.20	12.																		
2-27-68	72.	21	71.	7.0	0	234.	173.	36.	0.4	.18	13.																		
3-26-68	74.	15.	72.	7.4	0	217.	184.	33.	0.4	.20	14.																		
4-30-68	67.	21.	60.	7.0	0	215.	162.	24.	0.5	.15	10.																		
6-11-68	66.	19.	72.	7.1	0	198.	192.	27.	0.6	.20	6.5																		
8-6-68	48.	12.	38.	5.4	0	161.	105.	13.	0.4		13.																		
9-10-68	61.	20.	60.	6.8	0	198.	168.	22.	0.5	.21	7.9																		

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1 SE¼ Sec.32, T11S R33W
On Chicago, Burlington & Quinct Railroad bridge ½ mile North of Inter-
state 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
10-30-68	1150A	7.14	7500	14.	200.	8.3	620.	409.				216.	48.	168.	4.9		0.22			0.62	9.8	3.1				80000	16000	2700
12-18-68	12:45P	9.96	2530	0.	60.	8.1	800.	522.				298.	66.	232.	4.9		0.74			0.88	12.1	5.6				11000	13000	5700
2-19-69	12:00N	3.61	5050	1.	35.	8.1	710.	467.				252.	64.	188.	2.2		0.86			0.74	11.3	2.7				5300	3900	1700
3-19-69	12:00N	10.97	81400	7.	3400	7.9	540.	343.				198.	46.	152.	2.2		1.00			0.56	7.0	9.5				120000	28000	15000
4-30-69		9.22	148000	12.	1100	7.8	470.	316.				202.	54.	148.	5.3		0.30			0.90	8.0	4.5				46000	12000	3600
5-27-69		12.16	93400	22.	500.	7.9	500.	330.				202.	58.	144.	5.3		0.22			0.86	7.6	2.7				82000	24000	2000
6-25-69	11:00A	11.12	91200	23.	300.	8.0	470.	292.				192.	48.	144.	3.8		0.37			0.40	6.3	3.9				110000	29000	5600
8-27-69	12:36P	8.48	63200	24.	120.	8.2	760.	506.				258.	90.	168.	1.7		0.25			0.40	6.1	2.3				1300	600	16000
10-8-69	12:25P	7.97	2850	17.		8.1	750.	510.				254.	86.	168.	0.2		0.22			0.78	7.8	1.9				2800	500	8000
11-12-69	1:25P	6.71	2810	10.	85	8.1	720.	477.				263.	89.	174.	1.8		0.30			2.10	10.1	3.7						
12-10-69	11:45A	- -	2310	2.	75	7.8	720.	482.				255.	75.	180.	2.7		0.56			0.94	11.7	3.3				1200	300	9700
1-14-70	11:50A	- -	9170	1.	7	8.0	960.	630.				346.	126.	220.	3.1		0.97			2.40	11.3	5.1				1100	2000	4400

Milligrams per Liter

Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
10-30-68	62.	15.	50.	8.0	2.4	200.	128.	25.	0.4	.21	12.																		
12-18-68	85.	21.	63.	7.9	0	283.	150.	38.	0.5	.18	15.																		
2-19-69	70.	19.	56.	8.4	0	229.	142.	30.	0.5	.15	13.																		
3-19-69	53.	16.	39.	8.4	0	185.	101.	21.	0.4	.09	6.																		
4-30-69	61.	12.	22.	6.4	0	181.	72.	16.	0.4	.06	12.																		
5-27-69	58.	14.	28.	7.6	0	176.	87.	19.	0.5	.12	7.5																		
6-25-69	54.	14.	24.	5.5	0	176.	67.	20.	0.4	.12	15.																		
8-27-69	67.	22.	70.	7.8	0	205.	197.	25.	0.5		7.2																		
10-8-69	67.	21.	70.	7.2	0	205.	192.	26.	0.6	.17	6.8																		
11-12-69	66.	24.	61.	6.8	0	212.	178.	25.	0.5	.14	11.																		
12-10-69	66.	22.	63.	7.0	0	220	167.	27.	0.4	.18	12.																		
1-14-70	88.	30.	74.	8.6	0	268.	204.	50.	0.5	.15	14.																		

Station: 202 Missouri River at Kansas City, M ssouri, MO 366.1 SE¼ Sec.32, T11S R33W
On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Counts per 100 ml

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
2-25-70	9:20A	4.93	45400	0.	150.	8.0	730.	493.				258.	82.	176.	3.1		0.56			0.46	11.4	4.0				4300	3600	420
3-25-70	11:40A	4.47	42800	5.	130.	8.0	720.	499.				265.	85.	180.	4.4		0.45			2.50	11.4	4.1				71000	23000	18000
5-13-70	12:10P	6.96	61200	20.	1600.	8.0	570.	377.				228.	60.	168.	3.6		0.52			0.44	5.9	5.6				170000	53000	30000
6-10-70	1:15P	8.41	55200	22.	200.	8.2	600.	378.				234.	66.	168.	4.9		0.22			0.48	7.0	3.8				79000	4000	3700
7-29-70	1:00P	2.59	46800	26.	75.	8.1	770.	510.				254.	90.	164.	1.5		0.33			0.78	6.6	3.0				54000	14000	6000
8-19-70	12:15P	7.09	51100	26.	95.	7.9	740.	502.				256.	88.	168.	2.4		0.25			0.42	6.5	2.6				33000	14000	26000
10-14-70	1:25P	--	60400	12.	200.	8.0	650.	430.				229.	73.	156.	4.9		0.19			0.46	9.1	3.1				90000	28000	19000
11-18-70	12:46P	6.96	53440	4.	65.	7.9	730.	474.				248.	70.	178.	2.4		0.25			0.42	11.3	3.4				2700	300	1500
1-26-71	12:00N	2.93	25400	-1.	25.	8.0	790.	520.				270.	70.	200.	2.2		0.64			0.82	11.4	3.4				1000	300	2700
3-3-71	12:10P	12.18	73000	0.	220.	7.7	470.	315.				176.	42.	134.	8.0		0.72			0.72	11.7	4.0				49000	17000	19000
5-12-71	12:50P	12.18	86400	14.	380.	7.8	660.	426.				229.	73.	156.	4.9		0.30			1.70	6.6	3.8				8900	1400	4400
6-16-71		--	114000	17.	1000	7.5	500.	330.				188.	58.	130.	7.5		0.16			0.43	5.7	3.0				110000	46000	17000

Milligrams per Liter

Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
2-25-70	72.	19.	62.	7.6	0	215.	167.	29.	0.4	.15	14.																		
3-25-70	70.	22.	60.	8.0	0	220.	167.	27.	0.5		13.																		
5-13-70	62.	18.	35.	6.7	0	205.	99.	22.	0.4	.12	12.																		
6-10-70	61.	20.	39.	6.9	0	205.	115.	20.	0.4	.14	9.0																		
7-29-70	67.	21.	68.	7.4	0	200.	199.	22.	0.5	.17	9.2																		
8-19-70	65.	23.	68.	7.1	0	205.	195.	25.	0.5	.20	5.4																		
10-14-70	59.	20.	55.	6.3	0	190.	151.	21.	0.5	.15	12.																		
11-18-70	65.	21.	66.	6.5	0	217	177.	23.	0.5	.20	13.																		
1-26-71	72.	22.	65	7.6	0	244.	167.	35	0.5	.17	12.																		
3-3-71	51.	12.	29	8.2	0	163.	87.	19.	0.5		9.7																		
5-12-71	59	20.	55	7.6	0	190.	153.	23.	0.5	.12	15.																		
6-16-71	51.	15.	34	7.4	0	159.	99.	20.	0.6	.11	30.																		

State of Kansas
Department of Health and Environment
Division of Environment

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1 SE¼ Sec.32, T11S R33W On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City Missouri.

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
7-21-71		- -	63600	26.	230.	7.7	690.	466.				236.	82.	154.	4.2		0.33			0.32	6.4	1.4				500	100	2300
9-1-71		- -	50400	25.	55.	8.1	840.	544.				278.	106.	172.	2.2		0.33			0.46	6.8	2.3				24000	1600	12000
10-20-71	1:15P	- -	70200	16.	65.	7.9	780.	500.				232.	78.	154.	2.2		0.35			0.48	7.7	5.8				45000	1300	83000
12-15-71	12:30P	- -	28800	2.	220.	7.9	730.	490.				249.	79.	170.	3.5		0.48			0.50	11.9	4.2				120000	360000	16000
2-16-72	1:00P	2.96	29600	2.	15.	8.0	820.	530.				278.	82.	196.	0.4		0.60			0.60	12.3	4.3				130000	28000	17000
3-14-72	12:10P	4.37	40800	7.	200.	7.8	620.	404.				206.	54.	152.	3.5		0.74			1.60	9.9	4.9				70000	20000	18000
4-12-72	12:10P	2.49	51500	12.	75.	8.0	750.	486.				262.	94.	168.	2.9		0.45			0.84	9.7	3.6				29000	12000	15000
5-31-72	1:30P	10.94	75500	20.	400.	8.2	650.	440.				236.	76.	160.	3.6		0.40			0.46	7.3	3.9				80000	64000	12000
6-21-72	12:15P	9.28	66400	22.	1275.	7.9	730.	474.				252.	86.	166.	1.7		0.30			0.78	6.1	4.3				220000	34000	43000
7-20-72	11:50A	- -	62900	25.	380.	7.7	730.	472.				238.	88.	150.	2.9		0.60			0.49	5.6	3.9				65000	36000	22000
8-16-72	12:30P	- -	58700	29.	220.	8.1	670.	430.				232.	66.	166.	2.4		0.40			0.56	6.1	3.1				6100	1000	13000
9-1-72	1:45P	- -	104000	20.	300.	7.8	650.	420.				224.	68.	156	3.6		0.16			0.47	6.8	2.7				190000	47000	7000

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
7-21-71	62.	20.	60.	7.5	0	188.	173.	24.	0.5	.17	4.8																		
9-1-71	72.	24.	75.	6.5	0	210.	212.	33.	0.6	.21	9.4																		
10-20-71	57.	22.	76.	7.2	0	188.	194.	34.	0.5	.15	6.8																		
12-15-71	67.	20.	64.	6.5	0	207.	161.	36.	0.4	.17	21.																		
2-16-72	72.	24.	73.	7.0	0	239.	186.	39.	0.4	.15	13.																		
3-14-72	58.	15.	53.	7.4	0	185	139.	26.	0.4	.14	20.																		
4-12-72	62.	26.	65.	6.4	0	205	184.	30.	0.4	.15	8.8																		
5-31-72	65.	18.	50.	7.8	0	195	152.	27.	0.5	.12	11.																		
6-21-72	65.	22.	59.	7.4	0	202.	165.	32.	0.6	.12	14.																		
7-20-72	61.	21.	64.	6.6	0	183.	179.	32.	0.6		6.8																		
8-16-72	62.	19.	54.	7.2	0	202.	154.	23.	0.6		5.4																		
9-1-72	57.	20.	54	6.8	0	190.	157.	20.	0.5		7.9																		

State of Kansas
Department of Health and Environment
Division of Environment

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1 SE¼ Sec.32, T11S R33W On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City Missouri.

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
10-25-72		- -	67400	9.	200.	8.0	700.	448.				236.	74.	162.	5.3		0.22			0.48	8.9	4.8				36000	9000	70000
11-15-72	11	- -	103000	4.	1300.	7.9	510.	323.				184.	48.	136.	2.7		0.25			0.67	10.0	4.6				110000	140000	180000
1-2-73	12:45P	9.59	72700	0.	1900.	7.4	460.	298.				177.	41.	136.	4.4		0.80			0.62	10.1	5.7				39000	21000	110000
2-14-73	12:30P	- -	75100	-2.	250.	7.9	580.	365.				233.	55.	178.	6.9		0.67			0.52	12.2	2.3				45000	2000	19000
3-20-73	11:50A	14.81	118000	6.	650.	7.7	540.	334.				224.	64.	160.	9.4		0.56			0.54	10.3	4.0				25000	2200	37000
4-25-73	11:15A	11.87	83100	14.	550.	7.8	680.	419.				254.	78.	176.	8.0		0.25			0.92	7.8	2.7				27000	3500	4700
5-23-73	12:15P	10.85	81500	20.	400.	8.0	730.	470.				274.	94.	180.	3.6		0.25			0.64	6.7	2.9				59000	2200	14000
6-20-73	10:45A	8.36	65900	24.	300.	7.9	750.	452.				262.	76.	186.	3.6		0.22			0.58	6.5	1.8				36000	1500	6000
7-18-73	11:30A	5.25	45600	28.	350.	7.8	720.	422.				254.	76.	178.	5.1		0.07			0.42	6.4	4.4				21000	Lt 1000	2000
8-15-73	12:35P	- -	62700	25.	800.	7.6	560.	355.				204.	56.	148.	2.2		0.25			0.51	5.5	3.0				65000	16000	7000
9-5-73	11:50A	5.87	44400	24.	130.	8.2	770.	500.				268.	90.	178.	1.6		0.25			0.35	7.1	2.0				3500	1000	900
10-9-73	12:45P	11.14	82300	20.	350.	8.0	580.	369.				230.	62.	168.	4.6		0.16			0.60	7.3	2.2				24000	4500	14000

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
10-25-72	62.	20.	58.	5.6	0	198.	165.	25.	0.5		8.0																		
11-15-72	51.	14.	35.	6.0	0	166.	100.	20.	0.5		11.																		
1-2-73	53.	11.	27.	6.4	0	166.	70.	18.	0.4		11.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
2-14-73	67.	16.	32.	6.4	0	217.	93.	22.	0.1	.11	14.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
3-20-73	67.	14.	25.	7.0	0	195.	81.	21.	0.3		13.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
4-25-73	74.	17.	42.	6.4	0	215.	118.	33.	0.4		13.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
5-23-73	75.	21.	51.	6.6	0	220.	151.	38.	0.5	.17	14.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
6-20-73	72	20.	50.	7.0	0	227.	142.	31.	0.4	.15	14.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
7-18-73	67.	21.	57.	7.0	0	217.	174.	21.	0.5	.18	12.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
8-15-73	54.	17.	41.	5.8	0	181.	113.	22.	0.4	.14	10.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
9-5-73	66.	25.	69.	5.5	0	217.	178.	36.	0.4	.18	11.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
10-9-73	64.	17.	36.	7.2	0	205.	104.	23.	0.4	.14	14										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1 SE¼ Sec.32, T11S R33W On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
11-13-73	11:30A		94300	12.	200.	7.9	550.	342.				200.	52.	148.	3.1		0.19			0.44	9.9	1.0				16000	900	1200
12-5-73	12:00N		142000	3.	650.	7.7	500.	303.				188.	52.	136.	3.7		0.40			0.51	10.6	3.1				93000	6000	48000
1-16-74	12:00N	0.48	31000	0.	15.	7.9	880.	548.				320	84.	236.	4.0		0.64			0.64	11.4	1.6				1800	400	3400
2-13-74	11:00A	6.05	55100	4.	110.	7.9	780.	505.				290	78.	212.	5.4		0.56			0.54	11.6	2.0				8000	1000	4800
3-13-74	11:55A	6.12	56400	6.	200.	8.0	720.	449.				266.	68.	198.	7.4		0.16			1.70	10.2	2.3				18000	400	2200
4-24-74	10:16A		81100	14.	1500	7.7	580					232.	78.	154.	6.5		0.25			2.70	!					250000	6000	23000
5-14-74	1:15P	9.71	73800	18.	975.	7.4	700.	424.				246.	82	164.	5.4		0.19			0.56	6.5	6.0				200000	22000	34000

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
11-13-73	59.	13.	37.	6.2	0	181.	95.	26.	0.4	.15	13.										<0.5	<0.5	<1.0	<10	<0.3	<1.0	<1.0	<10	<50
12-5-73	54.	13.	29.	5.8	0	166.	76.	24.	0.3	.11	13.										<0.5	<0.5	<1.0	<10	<0.3	<1.0	<1.0	<10	<50
1-16-74	89.	24.	64.	6.2	0	288.	144.	56.	0.3	.17	18.										<0.5	<0.5	<1.0	<10	<0.3	<1.0	<1.0	<10	<50
2-13-74	85.	19.	55.	7.2	0	259.	139.	48.	0.4	.12	18.										<0.5	<0.5	<1.0	<10	<0.3	<1.0	<1.0	<10	<50
3-13-74	79.	20.	50.	5.6	0	242.	117.	38.	0.6		16.										<0.5	<0.5	<1.0	<10	<0.3	<1.0	<1.0	<10	<50
4-24-74	65.	17.					106.	35.					0.00	0.65		0.24		0.00	0.01	0.00	<0.5	<0.5	<1.0	<10	<0.3	<1.0	<1.0	<10	<50
5-14-74	66.	20.	52	5.4	0	200.	118.	47.	0.4		11.										<0.5	<0.5	<1.0	<10	<0.3	<1.0	<1.0	<10	<50

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1, SE¼ Sec.32, T11S R33W
On Chicago, Burlington, & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
6-11-74	11:00A	14.43	113000	18	2000	7.4	400.	247	2292	2020.	272	156	44.	112	8.0		0.25			0.77	7.3	3.6	104.			210000	11000	70000
7-9-74	11:35A	4.36	42600	28.	95.	7.9	790.	506.	129.	108.	21.	253.	83.	170.	1.4		0.10			0.50	7.0	2.8	19.			9000	500	1300
8-13-74	11:10A	4.13	43800	23.	220.	7.8	760.	484.	271.	225.	46.	243.	87.	156.	1.1		0.36			0.48	5.7	2.2	26.			31000	3600	16000
9-10-74	11:25A	3.86	37400	22.	110.	8.1	770.	496.				267.	97.	170.	0.9		0.08			0.44	7.7	2.1	19.			2900	100	800
10-15-74	11:45A	8.74	45600	13.	110.	7.9	770.	490.				255.	87.	168.	1.4		0.28			0.46	8.5	1.6	16.			5800	400	5000
11-12-74	11:30A	5.15	46200	9.	110.	8.1	740.	472.				254	70.	184.	2.3		0.24			0.52	9.6	1.1	9.			2800	300	12000
12-12-74	11:30A	16.7	28800	0.	65.	8.0	780.	486.	91.			266.	68.	198.	2.9		0.44			0.53	12.1	2.5	16.			29000	1800	27000
1-14-75	11:00A	0.35	22500	-2.	65.	8.0	780.	483.	64.			269.	63.	206.	2.3		0.40			0.44	12.9	0.8	12.			100	< 100	9000
2-11-75	12:00N	0.99	25000	-2.	25.	8.0	800.	497.	45.			266	68.	198	2.4		0.40			0.56	12.4	1.2	11.			1000	100	4900
3-12-75	11:15A	2.77	35400	0.	65.	7.9	730.	448.	101.			242.	64.	178.	2.5		0.40			0.56	12.0	1.9	15.			700	300	14000
4-8-75	11:10A	5.72	50600	6.	200	8.0	700.	451.	174.			270.	86.	184	5.7		0.32			0.54	10.3	2.4	21.			27000	2200	27000
5-13-75	11:45A	6.21	52500	20.	700.	7.9	670.	435.	822.			246.	66.	180	6.3		0.18			0.53	7.3	3.5	74.			51000	11000	36000

Milligrams per Liter

Date	Ca	Mg	Na	K	CO_3	Alk	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As
6-11-74	51.	7.0	22.	4.2		0.00	58.	19.		0.08	9.6		1.8	0.30	0.0	0.15	.000	0.00	0.00	0.00
7-9-74	64.	23.	72.	6.6			188.	41.		0.11	7.8									
8-13-74	58.	24.	71.	5.8			191.	32.		0.15	7.0									
9-10-74	64.	26.	68.	5.1			196.	26.		0.14	7.0									
10-15-74	61.	25.	70.	6.0			181.	36.		0.14	8.4									
11-12-74	69.	20.	65.	4.8			158.	33.		0.12	9.8									
12-12-74	72.	21.	67.	5.0		0.00	149.	37.		0.24	12.	1.5	0.15	0.05	0.0	0.03	.000	0.00	0.00	0.00
1-14-75	75.	20.	64.	5.2			152.	27.		0.18	13.									
2-11-75	72.	22.	63.	5.8			170.	23.		0.18	16.									
3-12-75	69.	17.	59.	4.8			141.	35.		0.25	14.									
4-8-75	69.	24.	50.	5.0			146.	28.		0.14	13.									
5-13-75	66.	20.	52.	6.0			142.	23.		0.14	11.									

Parts per Billion

Date	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
6-11-74	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
7-9-74	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
8-13-74	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
9-10-74	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
10-15-74	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
11-12-74	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
12-12-74	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
1-14-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
2-11-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
3-12-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
4-8-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
5-13-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50

Station: 20[illegible] Missouri River at Kansas City, Missouri, MO 356.1, SE¼ Sec.32, T11S R33W
On Chicago, Burlington,& Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp °C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
6-10-75	11:15A	12.11	87400	20.	[illegible]:00.	7.8	530.	329.	12.52.			192.	44.	148.	3.5		0.24			0.48	5.5	2.8	67.			150000	5000	20000
7-15-75	10:50A	9.36	66300	27.	1.0.	7.9	770.	475.	125.			261.	97.	164.	1.4		0.32			0.52	6.6	1.3	16.			2000	300	1000
8-12-75	11:10 A	8.91	64800	27.	110.	8.1	800.	499.	103.			246.	80.	166.	0.6		0.24			0.38	6.5	1.1	13.			2500	< 100	100
9-2-75	11:00 A	9.42	71500	27.	200.	8.1	760.	470.	188.			245.	83.	162	1.2		0.32			0.96	6.2	1.1	15.			8000	200	2200
11-11-75	11:35A	9.42	72100	13.	95.	8.0	750.	483.	85.			241.	87.	154.	1.2		0.19			0.72	8.9	1.8	13.			26000	1300	6000
12-2-75	12:00N	9.96	87600	4.	350.	8.1	680.	435.	412.			214.	62.	152.	2.8		0.40			0.48	11.3	1.5	30.			59000	6000	200000
1-6-76	12:00N	4.04	29900	-1.	60.	9.1	770.	505.	44.			262.	70.	192.	1.3		0.47			0.57	12.3	2.3	11.			3100	1200	11000
2-11-76	12:00N		35400	3.	50.	8.0	810.	520.	64.			265.	69	196.	2.0		0.42			0.43	12.0	2.3	11.			28000	4000	12000
3-10-76	12:00N	4.26	41100	6.	160.	8.0	700.	454.	134.			236.	64.	172.	5.8		0.32			0.46	11.5	2.5	10.			15000	9000	10000
4-7-76	11:20A	6.56	51400	19.	140.	7.6	720.	467.	148.			249.	79.	170.	3.2		0.24			0.50	9.2	2.5	20			69000	14000	16000
5-12-76	11:35A		61100	17.	320.	7.5	630.	392.	452.			221.	47.	174.	4.5		0.42			0.46	8.2	3.5	27.			> 80000	31000	8000
6-9-76	11:55A	6.75	49300	23.	98.	8.3	700.	447.	94.			239.	61.	178.	0.7		0.09			0.20	7.7	2.5	15.			13000	1400	1000

Milligrams per Liter

Date	Ca	Mg	Na	K	CO_3	Alk	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As
6-10-75	54.	14.	36.	4.5		0.00	98.	21.		0.18	8.4	1.2	0.00	0.05	0.0	0.08	.000	0.00	0.00	0.00
7-15-75	70.	21.	60.	6.0			183.	27.		0.15	8.1									
8-12-75	61.	23.	72.	5.8			210.	20.		0.20	7.3									
9-2-75	62.	22.	64.	5.2			192.	18.		0.20	7.0									
11-11-75	62.	21.	71.	5.5			196.	24.		0.09	8.9									
12-2-75	58.	17.	60.	6.1		0.00	169.	22.		0.14	8.5	0.24	0.06	0.03	0.1	0.05	0.000	0.00	0.00	0.00
1-6-76	69.	22.	68.	7.1			181.	26.		0.25	15.									
2-11-76	70.	22.	70	6.7			175.	40.		0.27	16.									
3-10-76	62.	20.	58.	6.0			153.	32.		0.23	13.									
4-7-76	62.	23.	60.	7.2			170.	27.		0.15	12.									
5-12-76	59.	18.	45.	6.2			130.	15.		0.17	9.4									
6-9-76	61.	21.	57.	6.1		0.00	167.	19.		0.21	7.9	0.13	0.03	0.13	0.0	0.0	0.000	0.00	0.00	

Parts per Billion

Date	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
6-10-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
7-15-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
8-12-75	< 0.5	< 0.5	< 10	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
9-2-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
11-11-75									
12-2-75	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
1-6-76									
2-11-76									
3-10-76									
4-7-76									
5-12-76									
6-9-76	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50

State of Kansas
Department of Health and Environment
Division of Environment

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1, SE¼, Sec. 32, T11S, R33W, On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp °C.	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	Ag	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
7-6-76	11:10A	6.50	51900	25.	120.	8.0	690.	433.	156.			227.	61.	166.	1.8		0.24			0.46	7.0	3.0	19.			31000	11000	3000
8-11-76	11:30A	5.30	42800	29.	76.	8.3	740.	476.	76.			235.	71.	164.	0.7		0.14			0.48	7.0	2.0	16.			120000	22000	19000
9-8-76	11:50A		40500	25.	80.	8.4	760.	488.	208			231.	67.	164.	1.2		0.38			0.55	7.0	4.8	31.			49000	18000	12000
10-13-76	12:30A	4.93	42000	17.	85.	8.2	740.	490.	85.			231.	67.	164.	0.1		0.17			0.89	8.8	5.1	26.			52000	8000	6000
11-3-76	11:45A	4.74	41800	10.	65.	8.2	720.	461.	48.			234.	64.	170.	1.2		0.28			0.50	10.6	1.2	30.	0.00		59000	15000	11000
12-15-76	12:30P	1.74	27000	0.	32.	7.9	810.	550.	45.			274.	76.	198.	1.5		0.58			0.40	12.5	4.2	28.			Gt 80000	40000	28000
2-9-77	01:05P	0.92	21400		12.	8.1	870.	556.	18.			283.	69.	214.	1.9		0.82			0.94	10.9	4.5	22.			Gt 80000	25000	8000
3-9-77	11:35A	3.17	29800	7.	40.	8.2	700.	448.	110.			229.	53.	176.	3.3		0.29			0.95			25.			70000	12000	7000
4-13-77	11:55A	4.80	40700	15.	60.	8.1	690.	467.	126.			234.	68.	166.	2.5		0.37			1.10	8.7	3.6	51.			200000	30000	2000

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
7-6-76	59.	20.	55.	6.4			143.	30.		0.14	7.5																		
8-11-76	58	22.	69.	6.1			191.	33		0.23	7.0																		
9-8-76	58.	21.	72.	6.3			197.	27.		0.22	7.4																		
10-13-76	58.	21.	80.	6.0			176.	44.		0.22	8.0																		
11-3-76	54.	21.	66.	5.4			174.	32.		0.19	10.	0.00	0.01	0.08	0.25	0.01	.000	0.00	0.00	0.00									
12-15-76	72.	23.	78.	5.7			201.	38.		0.28	11.																		
2-9-77	74.	24.	81.	6.7			174.	43.		0.33	17.																		
3-9-77	59.	20.	62.	6.9			143.	32.		0.26	15.																		
4-13-77	61.	20.	62.	7.5			168.	32.		0.14	13.																		

Station: 202 Missouri River at Kansas City, Missouri, MO 366.1, SE¼, Sec. 32, T11S, R33W, On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter / Counts per 100 ml

Date	Time	Gage	Flow	Temp C	NTu	pH	Sp. Cond.	Tot D.S.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3 (N)	Ex-ALK	NH_3 (N)	TKN	TON	Tot P	DO	BOD_5	COD	Ag	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
5-11-77	11:35A	5.56	45[illegible]	19.	400.	7.7	640.		630.						0.6		0.26			0.86	6.4	3.0	49.			500000	26000	10000
6-7-77	11:25A	7.08	51[illegible]	23	700.	8.1	470.	302.	800			164.	38.	126.	0.8	0	0.21			0.98	6.2	4.2	8.4	0.00		230000	90000	Lt 1000
7-13-77	11:35A	4.65	45[illegible]	25	140.	8.2	620.	400.	280.			207	61.	146.	0.2	0	0.23			0.56	6.5	2.7	30.			170000	24000	1000
8-10-77	11:30A	[illegible]	59200	[illegible]	310.	8.1	680.		444.			216.	70.	146.	0.7	0.	0.35			0.58	5.9	4.5	69.			500000	70000	4000
9-13-77	12:05P	12.67	200000	19.	580	7.3	250.	178.	2620			109.	23.	86.	0.7	0.	0.29			2.0	5.6	7.8	102.			620000	60000	140000
10-11-77	11:45A	7.66	51[illegible]	11	100.	7.9	610.	364.	364.			203.	59.	144.	1.0	0	0.17			0.47	10.4	3.9	50.			200000	18000	3000
11-2-77	11:05A	12.75	106000	11.	400.	7.9	470.	311.	290			179.	43.	136.	1.0	0.	0.27			0.88	8.2	6.6	120	0.00		130000	28000	7000
12-14-77	12:05P	1.34	28500	2.	38.	8.0	810	474.	54.			299.	82.	212.	1.5	0.	0.48			0.04	12.4	2.7	26.			41000	4000	2300
1-10-78	11:45A	0.49	27000	-1.	25.	8.0	770.	490.	44.			378.	90	198.	1.2	0.	0.54			0.24	13.4	4.2	29.			140000	19000	1900
2-22-78	11:40A	[illegible]	24000	-1	16	7.9	840	516	24.			281	83.	198.	0.8	0.	0.72			0.26	12.3	2.7	13.			28000	17000	1200
[illegible]	[illegible]		74200	1.	380.	7.8	410	310.	1020			164.	40.	124.	1.6	0.	0.81			0.87	11.2	6.6	107.			90000	7000	Lt 1000
[illegible]	[illegible]	[illegible]	114000	13.	[illegible]	7.7	[illegible]	[illegible]	2130			166.	38.	128.	1.8	0.	0.37			2.2	—	6.3	103.			130000	22000	34000

Milligrams per Liter

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2
5-11-77			55.	6.8						0.19	9.7
6-7-77	46.	12.	35.	7.3	0.0	154.	91.	18.		0.12	10.
7-13-77	55.	17.	50	1.4	0.0	178.	152.	21.		0.20	8.5
[illegible]	57	18	59.	6.7	0.0	172.	[illegible]	30.		0.13	7.5
[illegible]	35.	5.3	12.	5.0	0.0	105.	38.	13.		[illegible]	9.5
[illegible]	55.	16.	44.	[illegible]	0.0	176.	115.	22.		0.27	14.
[illegible]	52.	12	30.	[illegible]	0.0	166.	[illegible]	31.		0.20	13.
[illegible]	82.	21.	55	7.4	0.0	259.	[illegible]	40.		[illegible]	17
[illegible]	75	22.	60.	7.1	0.0	242	117.	36.		0.35	17
[illegible]	79	21.	70.	6.1	0.0	242.	152	42.		0.27	16.
[illegible]	50.	7.5	35	[illegible]	0.0	151.	[illegible]	17		0.10	10.
					[illegible]			[illegible]			11

Parts per Billion

Date	Fe	Mn	Cu	Pb	Zn	Hg	Cr	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
5-11-77																		
6-7-77	0.11	0.00	0.10	0.10	0.00	.000	0.01	0.00	0.01									
7-13-77																		
[illegible]																		
[illegible]																		
[illegible]																		
[illegible]	0.11	0.00	0.08	0.30	0.08	.000	0.00	0.00	0.01									
[illegible]																		
[illegible]																		
[illegible]																		
[illegible]										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 10	Lt 10	Lt 10	Lt 50

Station: 202 Missouri River at Kansas City, Missouri, MO-366.1, SE¼, Sec. 32, T11S, R33W, On Chicago, Burlington & Quincy Railroad bridge ½ mile north of Interstate 70, in Kansas City, Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp °C	NTu	pH	Sp. Cond.	Tot D.S.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3 (N)	Ex-ALK	NH_3 (N)	TKN	TON	Tot P	DO	BOD_5	COD	Ag	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
5-10-78	12:10P	—	71700	13.	700.	7.7	420.	293.				173.	39.	134.	1.9	0.	0.40			1.3	7.4	7.2	50.			190000	38000	21000
6-23-78	8:47A	8.74	66100	24.	803.	8.0	540		1595.			137.	0.	148.	1.4	11.	0.29			2.1	5.1	7.0		0.00		1230000	69000	2800
7-5-78	11:40A		57400	29.	61.	8.3	550.	346.	156			221.	69.	152.	1.0	0.	0.29			0.26	6.4	2.7	46.	0.00		13000	1000	2000
8-2-78	12:45P	—	17400	24	115	7.8	530	318.	252.			202.	58.	144.	1.2	0.	0.11			0.43	6.5	3.0	27.			100000	31000	4000
9-11-78	12:00P	—	56300	26.	33.	8.0	710.	499.	56			242.	84.	158.	0.0	0.	0.14			0.19	6.5	2.7	27.			22000	10000	4100
10-17-78	12:00P	7.63	80300	18.	33.	8.0	680.	482.	82.			241.	77.	164.	0.5	0.	0.23			0.21	6.7	1.8	26.			17000	5100	4800
11-15-78	11:10A	8.31	67600	7.	35.	8.3	660.	453.	76.			230.	68.	162.	0.5	0.	0.15			0.18	10.2	0.9	21.			9000	200	900
12-13-78	11:30A	3.33	38100	2.	34.	7.9	650.	466.	87.			247.	65.	182.	1.1	0.	0.39			0.20	12.2	3.0	20.			52000	22000	5700

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Cr	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
5-10-78	48.	13.	28.	6.1	0.0	164.	74.	20.		0.04	11.																		
6-23-78	30.	15.			6.0	131.	121.	25.						0.03	0.09	0.11	0.000	0.01	0.00	0.01									
7-5-78	54.	18.	47.	4.8	0.0	135.	135.	27.		0.00	4.3	0.06	0.00	0.08	0.03	0.05	0.000	0.00	0.00	0.00									
8-2-78	58.	14.	44.	7.0	0.0	126.	126.	22.		0.23	4.5																		
9-11-78	64.	20.	70.	6.8	0.0	193.	213.	23.		0.22	6.4										40.5	40.5	41.0	41.0	40.3	41.0	41.0	41.0	41.50
10-17-78	62.	21.	63.	6.1	0.0	200.	147.	22.		0.17	10.																		
11-15-78	61.	19.	62.	5.7	0.0	145.	173.	31.		0.23	11.																		
12-13-78	66.	20.	58.	5.7	0.0	232.	164.	27.		0.24	11.																		

Station: 202 Missouri River at Kansas City,Mo.,MO-366.1,SE¼,Sec.32,T50N,R33W, On Chicago,Burlington,and Quincy Railroad Bridge,½ mile north of Interstate 70,in Kansas City,Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp °C	NTU	pH	Sp. Cond	Tot. D.S.	Tot. S.S.	Fix. S.S.	Vol. S.S.	Hardness Tol.	Hardness Carb	Hardness Non Carb	Tot. Alk.	NO_3 (N)	Ex. Alk.	NH_3 (N)	TKN	Ton	Tot. P	DO	BOD_5	COD	Oil & Gr.	Tot. Coli-	Fecal Coli.	Fecal Strep
2-21-74	12:10P	2.52	34000	2.	13.	7.5	680.	455.	20.			254.	184.	70.	184.	0.7	0.	0.51			0.34	11.0	3.9	17.		51000	10000	1500
3-7-74	11:15A		123000	2.	450.	7.4	430	278	990.			156.	122.	34.	122	2.5	0.	0.88			1.1	11.4	8.1	93.		23000	13000	4000
4-11-74	11:55A	13.81	117000	5.	250.	7.9	490.	299.	560.			184.	136.	48.	136.	2.4	0.	0.34			0.54	9.8	3.6	75.		55000	6000	2000
5-9-74	11:05A	10.02	75000	20.	110.	7.9	670.	445.	260.			253.	174.	79.	174.	1.7	0.	0.26			0.36	8.3	3.3	45.		110000	16000	6000
6-12-74	11:49A	7.76	61000	22.	49.	8.1	740.	449.	94.			243.	172.	71.	172.	0.9	0.	0.28			0.27	7.6	3.0	41.		190000	24000	2000
7-18-74	11:32A	8.78	73300	25.	400.	7.9	600.	345.	760.			201.	146.	55.	146.	1.2	0.	0.26			0.81	7.7	4.5	90.		25000	9000	4000
8-14-74	12:40P	5.38	50700	23.	50.	7.9	800.	490.	104.			249.	166.	83.	166.	0.6	0.	0.18			0.23	6.9	4.2	27.		110000	14000	41000
9-12-74	11:10A	4.96	47300	25.	90.	8.0	800	469.	200.			247.	168.	79.	168.	1.1	0.	0.20			0.30	9.9	3.9	41.		23000	12000	1000
10-10-74	11:00A	4.77		15.	38.	8.2	800	512.	102.			255.	168.	87.	168.	0.6	0.	0.22			0.23	9.0	3.9	22.		85000	8000	1000
11-6-74	11:05A	7.71		8.	400.	7.7	600.	376.	—			205.	146.	59.	146.	1.6	0.	0.25			—	10.0	3.6	—		49000	20000	15000
12-4-74	12:27P	5.44		1.	38.	8.0	780.	506.	86.			274.	190.	84.	190.	1.8	0.	0.23			0.19	13.7	1.8	22.		25000	14000	7600
1-24-75	11:45A	2.13		0.	27.	8.1	830.	531.	54.			279.	192.	87.	192.	1.6	0.	0.08			0.21	14.0	2.1	17.		26000	5000	4000

Milligrams per liter

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn					
2-21-74	69.	20.	65.	6.0	0.0	224.	168.	30.		0.22	13.																	
3-7-74	48.	5.8	25.	7.7	0.0	149.	72.	16.		0.16	13.	0.20	0.03	0.00	0.5	—	0.01	0.03	0.01	0.0000	0.000	0.01	0.09					
4-11-74	54.	13.	24.	8.0	0.0	166.	76.	18.		0.20	13.																	
5-9-74	70	19.	49	7.7	0.0	212.	142.	32.		0.15	12.																	
6-13-74	66.	19	58.	5.4	0.0	210.	164.	27.		0.07	1.																	
7-18-74	56.	15	42.	6.6	0.0	178.	124.	19.		0.02	7.																	
8-14-74	62.	33.	67	6.1	0.0	203.	194.	26.		0.19	9.																	
9-12-74	66.	20.	59.	6.1	0.0	205.	175.	25.		0.20	11.																	
10-10-74	66.	22.	74	5.7	0.0	205.	202.	28.		0.18	10.																	
11-6-74	56.	16.	43	6.5	0.0	178.	124.	22.		0.24	14.																	
12-4-74	72.	23.	61	5.1	0.0	232.	186.	24.		0.18	12.																	
1-24-75	74.	23.	64	6.1	0.0	234.	197.	25.		0.20	16.																	

Station: 202 Missouri River at Kansas City,Mo.,MO-366.1,SE¼,Sec.32,T50N,R33W, On Chicago,Burlington,and Quincy Railroad Bridge,½ mile north of Interstate 70,in Kansas City,Missouri.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp °C	NTU	pH	Sp. Cond	Tot. D.S.	Tot. S.S.	Fix. S.S.	Vol. S.S.	Hardness Tol.	Hardness Carb	Hardness Non Carb	Tot. Alk.	NO_3 (N)	Ex. Alk.	NH_3 (N)	TKN	Ton	Tot. P	DO	BOD_5	COD	Oil & Gr.	Tot. Coli-	Fecal Coli.	Fecal Strep
3-20-80	12:00N	1.39		1.	14.	7.9	880.	542.	41.			287.	204.	83.	204.	1.3	0.	0.37			0.13	13.6	2.4	30.		13000	8000	2200
4-23-80	11:52A	6.42		4.	220.	7.9	670.	427.	220.			238.	176.	62.	176.	2.0	0.	0.39			0.65	11.1	4.2	72.		24000	10000	31000
4-28-80	11:24A			9.	700.	7.7	440.	280.	1490.			164.	124.	40.	124.	2.3	0.	0.17			1.2	10.0	5.4	86.		16000	9000	35000
5-14-80	12:00N	5.31		17.	34.	8.4	790.	514.	92.			254.	172.	82.	172.	0.9	0.	0.03			0.17	9.1	5.7	47.		85000	25000	3000
6-11-80	11:56A			24.	670.	8.0	630.	410.	1280.			218.	156.	62.	156.	2.1	0.	0.19			1.1	6.2	4.8	86.		60000	23000	4000
7-16-80	11:45A	3.67		31.	34.	8.3	860.	539.	134.			254.	166.	88.	166.	0.7	0.	0.17			0.29	6.1	2.7	27.		180000	52000	1000
8-13-80	11:42A	5.82		29.	50.	8.2	930.	537.	126.			251.	158.	93.	158.	0.4	0.	0.12			0.29	4.5	3.3	29.		150000	17000	2000

Milligrams per liter

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn
3-20-80	77.	23.	68.	6.3	0.0	244.	188.	38.		0.20	14.												
3-28-80	64.	19.	50.	6.5	0.0	215.	135.	31.		0.32	15.												
4-28-80	50.	9.5	24.	5.3	0.0	151.	76.	15.		0.25	12.	0.28	0.02	0.01	0.6	0.003	0.00	0.03	0.02	0.0000	0.000	0.00	0.13
5-14-80	64.	23.	69.	6.3	0.0	210.	205.	31.		0.22	8.												
6-11-80	61.	16.	45.	6.9	0.0	190.	132.	27.		0.16	16.												
7-16-80	64.	23.	81.	6.1	0.0	203.	213.	40.		0.18	8.												
8-13-80	41.	34.	81.	5.7	0.0	143.	234.	28.		0.17	6.												

Station: 203 Kansas River at Kansas City, Kansas, KA-0.3, NE¼, NE¼, Sec. 10, T11S, R25E, On James Street Bridge, ½ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Micrograms per Liter

Date	Time	Temp. °C	Aldrin	Dieldrin	Chlordane	DDT O,P'	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor	Atrazine	Ramrod	Alachlor	Sencor	Dacthal	PCBs	2-4,D	2,4,5 TP	Toxaphene	Trichloroethylene	Vinyl chloride		
8-2-78	12:32P	25	<1.0.5	<1.0.5	<1.1.0	<1.10	<1.0.3	<1.1.0	<1.1.0	<1.10	<1.50	4.4												
3.7.79	10:55A	3.	<1.0.25	<1.0.05	<1.0.12	<1.0.10	<1.0.10			<1.0.25	<1.0.20	1.8	<1.0.25	<1.0.25	<1.0.10	<1.0.05	<1.0.50	<1.0.40	<1.0.20	<1.2.0				
3-12-80	11:30A	4.	LT.0.25	LT0.05	LT0.12	LT0.10	LT0.10			LT.0.25	LT0.20	LT 1.2	LT0.25	LT0.25	LT0.10	LT0.05	LT0.50	LT0.40	LT0.20	LT2.0				

Micrograms per Liter

Date	Time	Temp.	DDT P,P'	2,4,5 T																							
8-2-78																											
3.7.79			<1.0.10	<1.0.20																							
3-12-80			LT0.10	LT0.20																							

Station: 203 Kansas River at Kansas City, Kansas KA 0.3, NE¼ Sec.10, T11S R25E
On James Street bridge, ½ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
7-11-67	9:00A		10850	26.	500.	7.8	490.	310.				188.	48.	140.	4.9					0.50	6.5							
8-22-67	8:10A		3050	25.	70.	8.1	590.	368.				204.	28.	176.	2.2		0.19			1.00	7.1	4.2				30000	5600	700
9-26-67	8:20A		19850	19.	2800.	7.9	260.	170.				100.	8.	92.	3.5		0.22			0.40	7.3	3.4				120000	8400	7100
10-25-67	12:45P		5950	11.	200.	8.3	610.	373.				246.	50.	196.	1.5		0.13			0.70	8.9	3.6				92000	21000	4000
12-6-67	11:35A		3285	8.	35.	8.1	770.	496.				281.	65.	216.	3.5		0.25			0.80	11.6	5.3				36000	4800	69000
1-30-68	11:50A		3350	4.	25.	8.2	850.	520.				288.	66.	222.	2.7		0.56			1.00	11.7	2.3				7500	1100	1400
2-27-68			2645	2.	8.	8.2	920.	580.				304.	70.	234.	4.9		0.71			1.10	12.7	4.2				500	400	700
3-26-68			1385	12.	25.	8.4	1110.	690.				358.	110.	248.	6.2		0.40			1.40	13.8	9.3				36000	3700	11000
4-30-68	12:00N		4615	18.	110.	8.0	610.	396.				248.	44.	204.	4.2		0.30			0.80	8.3	2.9				4700	700	24000
6-11-68	1:00P		3250	27.	30.	8.3	650.	408.				208.	44.	164.	1.3		0.13			0.70	6.3	6.8				22000	11700	15700
8-6-68	1:00P		16850	26.	500.	7.8	290.	200.				124.	16.	108.	6.2		0.33			1.40	5.6	3.8				100000	11000	1700
9-10-68	11:30A		4475	20.	140.	7.6	540	341.				192	24.	168	5.3		0.45			1.00	7.5	3.7				67000	10000	110000

Milligrams per Liter

Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
7-11-67	59.	10.	25.	7.6		171.	50.	35.	0.4	.15	9.4																		
8-22-67	67.	9.	39.	10.		215.	59.	48.	0.4	.15	12.																		
9-26-67	32.	4.9	10.	6.2		112.	14.	12.	0.5	.12	12.																		
10-25-67	74.	15.	34.	8.1	7.2	224.	70.	42.	0.4	.13	12.																		
12-6-67	88.	15.	59.	7.4	0	264.	95.	76.	0.3	.16	7.8																		
1-30-68	91.	15.	63.	6.6	0	271.	99.	81.	0.2	.15	12.																		
2-27-68	99.	14.	81.	7.2	0	285.	120.	94.	0.4	.16	12.																		
3-26-68	104.	24.	103.	8.6	19.	264.	150	133.	0.4	.18	7.1																		
4-30-68	78.	13.	35.	6.8	0	249.	79.	35.	0.4	.12	9.2																		
6-11-68	59.	15.	58.	8.5	4.8	190.	94.	66.	0.4	.12	38.																		
8-6-68	40.	5.8	10.	4.6	0	132.	26.	10.	0.4		16.																		
9-10-68	59	11.	38.	8.2	0	205	60.	40.	0.4	.14	7.9																		

Station: 203 Kansas River at Kansas City, Kansas KA 0.3 NE¼ Sec.10, T11S R25E
On James Street bridge, ¼ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
10-30-68	11:20A		7550	12.	220.	8.1	470.	295.				183.	31.	152.	4.2		0.33			0.80	9.6	3.8				160000	21000	2000
12-8-68	12:15P		2535	0.	75.	8.0	750.	464.				302.	68.	234.	5.8		0.90			1.30	12.3	4.4				60000	16000	2900
2-19-69	11:35A		5100	2.	85.	8.1	620.	384.				246.	50.	196.	3.6		0.56			1.00	12.4	1.6				900	700	400
3-19-69	11:30A		10150	10.	180.	8.2	490.	311.				184.	28.	156.	2.0		0.24			0.82	10.0	2.3				9000	1700	200
4-30-69			27050	13.	1600	7.7	380.	234.				160.	18.	142.	4.9		0.30			0.64	8.3	5.5				28000	10000	4700
5-27-69			32850	21.	800	8.0	400.	260.				148.	14.	134.	5.3		0.19			1.20	7.9	2.3				51000	4000	1200
6-25-69	10:45A		31950	24.	1500	7.9	400.	242.				170.	30.	140.	4.2		0.30			0.42	6.5	3.6				93000	16000	20000
8-27-69	12:15P		2630	25.	110.	8.4	760.	470.				254.	56.	198.	0.6		0.60			1.00	6.7	5.6				100	47100	2900
10-8-69	12:05P		2900	17.	55.	8.2	760.	466.				237.	53.	184.	3.1		0.33			1.20	9.3	5.7				390	10	27000
11-12-69	1:00P		2860	12.	25.	8.4	690.	439.				250.	48.	202.	2.7		0.30			2.60	12.4	6.8						
12-10-69	11:10A		2360	3.	15.	7.8	610.	372.				232.	42.	190.	5.3		1.00			0.86	11.6	2.8				3600	2100	4000
1-14-70	11:10A		800	1.	25.	7.8	1350.	854.				474.	142.	332.	6.2		2.10			3.80	11.1	7.0				4800	4600	1300

Milligrams per Liter

Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
10-30-68	57.	10.	29.	8.0	0	185.	47.	36.	0.4	.10	16.																		
12-8-68	88.	20.	45.	8.6	0	285.	76.	61.	0.7	.18	15.																		
2-19-69	69.	18.	35.	8.4	0	239.	64.	42.	0.4	.12	11.																		
3-19-69	58.	96.	28.	8.8	0	190.	63.	26.	0.2	.08	97																		
4-30-69	50.	8.5	14.	5.6	0	173.	32.	14.	0.4	.06	8.2																		
5-27-69	50.	5.6	22.	7.6	0	163.	45.	18.	0.3	.08	8.1																		
6-25-69	50.	11.	17.	5.5	0	171.	36.	16.	0.4	.09	10.																		
8-27-69	77.	15.	63	8.6	4.8	232.	91.	75.	0.5		8.1																		
10-8-69	77.	11.	65.	10.	0	224	91.	81.	0.4		7.1																		
11-12-69	77.	14.	52.	8.8	17.	212.	86.	58.	0.4	.17	11.																		
12-10-69	75.	11.	34.	9.1	0	232.	49.	45.	0.4	.14	11.																		
1-14-70	144.	28.	110.	10.	0	405.	184.	145.	0.3	.21	12.																		

Station: 203 Kansas River at Kansas City, Kansas KA 0.3 NE¼ Sec. 10, T11S R25E
On James Street bridge, ¼ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
2-25-70	9:00A		2120	5.	25.	8.2	890.	572.				315.	95.	220.	3.8		0.56			1.40	11.0	7.4				500	260	490
3-25-70	11:20A		1780	8.	35.	8.5	890.	562.				282.	67.	215.	3.8		0.30			3.00	13.0	6.7				240	290	200
5-13-70	11:50A		15950	21.	1600.	7.8	470.	290.				193.	25.	168.	3.8		0.67			0.40	5.5	5.7				34000	22000	29000
6-16-70	12:55P		11350	22.	200	8.2	470.	283.				194.	24.	170.	5.8		0.22			0.40	7.1	1.3				1900	L+10	3000
7-29-70	12:36P		1590	29.	55.	8.4	650.	391.				206.	38.	168.	0.7		0.16			1.10	6.7	5.4				3800	1700	90
8-19-70	12:00N		1200	28.	85.	8.0	630.	388.				192.	40.	152.	2.4		0.13			1.30	4.8	8.5				24000	22500	220
10-14-70	1:00P		5430	13.	130.	8.0	470.	296.				180.	32.	148.	5.3		0.25			0.74	9.0	2.0				9700	1700	2200
11-18-70	12:30P		3203	5.	15.	7.9	770.	470.				260.	52.	208.	3.6		0.56			2.20	11.3	2.1				10	L+10	40
1-26-71	11:36A		3503	-1.		8.1	790.	482.				280.	62.	218.	4.2		0.86			1.40	12.1	2.2				1300	300	160
3-3-71	1130A		19800	0.	200.	8.0	490.	300.				192.	32.	160.	4.9		0.38			0.60	12.8	2.8				5700	1100	11000
5-12-71	12:30P		6940	17.	95.	8.1	550.	346.				200.	52.	148.	4.2		0.71			0.98	7.1	2.9				2200	700	4300
6-16-71			16600	24.	700.	7.7	350.	230.				152.	48.	104.	8.4		0.19			0.59	6.4	2.1				20000	3000	3100

Milligrams per Liter

Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
2-25-70	90.	22.	71.	10.	0	268.	120.	88.	0.3	.17	9.0																		
3-25-70	90.	14.	28.	10.	19.	224.	118.	92.	0.4		5.0																		
5-13-70	61.	10.	23.	5.4	0	205.	47.	22.	0.4	.08	7.1																		
6-10-70	58.	12.	21.	6.7	0	207.	45.	19.	0.4	.11	9.7																		
7-29-70	61.	13.	51.	10.	4.8	195.	80.	59.	0.5	.15	10.																		
8-19-70	57.	12.	54.	8.8	0	185.	75.	65.	0.4	.17	5.8.																		
10-14-70	54.	11.	30.	5.2	0	181.	44.	34.	0.4	.11	15.																		
11-18-70	81.	14.	59.	8.2	0	254.	87.	69.	0.4	.15	13.																		
1-26-71	89.	14.	54.	6.4	0	266.	92.	64.	0.3	.14	5.1																		
3-3-71	59.	11.	27.	5.9	0	195.	58.	27.	0.4		8.8																		
5-12-71	64.	10.	37.	8.2	0	181.	67.	45.	0.5	.09	10.																		
6-16-71	43.	11.	12.	6.7	0	127.	40.	21.	0.6	.08	22																		

10-70

Station: 201 Kansas River at Kansas City, Kansas KA 0.3, NE¼ Sec.10, T11S R25E
On James Street bridge, ¼ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
7-21-71			5,670	26.	210.	8.1	540.	349				196.	54.	142.	5.3		0.25			0.54	6.7	1.9				600	100	2800
9-1-71			1,710	26.	110.	8.2	1200.	700.				301.	103.	198.	1.1		0.19			1.60	5.4	4.1				7000	200	2400
10-21-71	1:00P		1,460	17.	110.	7.3	780.	446.				178.	82.	96.	2.2		0.64			1.30	2.7	8.0				290000	77000	6+100000
12-15-71	12:10P		5,080	2.	220.	7.9	750.	480.				270.	86.	184.	4.2		0.78			0.94	11.1	4.6				41000	6300	21000
2-16-72	12:35P		850.	1.	7.	8.0	1070.	652.				341.	107.	234.	8.0		1.10			1.80	12.2	3.4				9800	2600	2000
3-14-72	11:55A		1,240	9.	65.	7.9	1070.	640.				342.	128.	214.	0.4		0.30			1.50	7.8	7.5				900	300	400
4-12-72	11:50A		1,470	16.	35.	8.3	1100.	648.				322.	102.	220.	0.7		0.71			1.70	8.5	7.0				49000	4000	1500
5-31-72	1:15P		5,900	22.	110.	7.9	640.	400.				233.	57.	176.	0.4		0.33			0.34	10.9	7.6				300	200	2400
6-21-72	12:00N		3,360	24.	10.	8.0	740.	464.				228.	80.	148.	0.7		0.25			0.67	4.2	4.7				11000	2600	1500
7-20-72	11:25A		3,890	26.	70.	7.4	790.	466.				218.	76.	142.	0.4		0.56			0.62	4.2	4.4				15000	300	1100
8-16-72	12:10P		7,490	29.	380.	8.1	510.	310.				184.	28.	156.	2.4		0.25			0.62	5.7	3.2				41000	2700	4600
9-27-72	1:35P		3,820	21	170.	8.0	520.	321.				192	53.	144.	3.6		0.19			0.78	7.2	2.2				8000	700	7000

Milligrams per Liter

Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Al-drin	Diel-drin	Chlor-dane	DDT	En-drin	Hepta-chlor	Hepta-chlor Epox.	Lin-dane	Meth-oxy-chlor
7-21-71	59.	12.	36.	9.1	0	173.	74.	45.	0.5	.09	8.6																		
9-1-71	86.	21.	127.	10.	0	242.	140.	180.	0.5	.20	13.																		
10-21-71	43.	17.	84.	8.8	0	117.	95.	122.	0.3	.11	8.4																		
12-15-71	80.	17.	58.	6.8	0	224.	99.	79.	0.4	.12	16.																		
2-16-72	102.	21.	92.	7.4	0	285.	143.	122.	0.3	.14	18.																		
3-14-72	94.	26.	98.	7.6	0	261.	148.	138.	0.3	.17	5.8																		
4-12-72	91.	23.	104.	8.0	0	268.	145.	138.	0.4	.18	4.6																		
5-31-72	67.	16.	48.	7.8	0	215.	91.	58.	0.4	.08	3.2																		
6-21-72	67.	15.	64.	8.6	0	181.	105.	86.	0.5	.09	4.0																		
7-20-72	61.	16.	76.	8.0	0	173.	96.	107.	0.4		6.5																		
" "-72	54	12.	33.	7.8	0	190.	62.	33.	0.5		8.2																		
12	56.	14.	35.	8.2	0	176.	65.	44.	0.5		6.8																		

State of Kansas
Department of Health and Environment
Division of Environment

Station: 203 Kansas River at Kansas City, Kansas KA 0.3, NE¼ Sec. 10, T11S R25E
On James Street bridge, ¼ mile east of Interstate 70.

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Milligrams per Liter: Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness: Tot	Hardness: Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	TOC	Oil & Gr.	Counts per 100 ml: Tot. Coli.	Fecal Coli.	Fecal Strep
10-25-72			1,990	10.	65.	8.3	1000.	594.				313.	113.	200.	3.6		0.25			1.00	12.2	7.4				100	Lt 100	Lt 100
11-15-72			23,400	4.	1300	7.8	400.	236.				152.	30.	122.	2.7		0.48			0.86	10.0	3.8				160000	12000	48000
1-2-73	12:20P		16,800	1	1700.	7.8	400.	257.				164.	28.	136.	3.8		0.56			0.54	9.5	3.6				53000	9000	67000
2-14-73	12:05P		18,600	0.	170.	8.0	510.	313.				220.	50.	170.	5.1		0.56			0.50	12.5	1.8				16000	2500	9000
3-20-73	11:25A		39,700	7.	380.	7.8	510.	307.				214.	60.	154.	4.5		0.52			0.42	10.8	3.4				19000	2600	13000
4-25-73	11:15A		33,300	15.	550.	7.7	690.	405.				233.	77.	156.	6.0		0.25			1.90	8.5	3.0				43000	2400	2100
5-23-73	11:55A		17,800	20.	700.	7.9	740.	449.				258.	88.	170.	4.0		0.45			0.58	6.7	2.8				14000	12000	14000
6-20-73	10:25A		13,100	24.	300.	8.0	690.	416.				256.	72.	184.	3.6		0.19			0.63	7.0	1.7				16000	700	Lt 100
7-18-73	10:50A		3,960	28.	85.	7.7	1200.	694.				274.	108.	166.	0.6		0.16			0.58	7.0	6.4				200	100	800
8-15-73	12:15P		14,100	25.	400.	7.8	500.	299.				192.	42.	150.	3.1		0.22			0.46	4.3	2.4				74000	2800	1900
9-5-73	11:30A		5,000	24.	170.	8.4	980.	583.				288.	82.	204.	1.4		0.25			0.50	7.7	4.1				26000	1800	700
10-9-73	12:15P		28,800	20.	800.	8.1	480.	296.				200.	48.	152.	4.6		0.19			0.58	7.6	1.9				77000	9000	2700

Date	Milligrams per Liter: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Parts per Billion: Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
10-25-72	86.	24.	92.	7.8	0	240.	118.	132.	0.5		9.2																		
11-15-72	46.	9.0	22.	5.6	0	149.	37.	28.	0.4		11.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
1-2-73	51.	9.0	18.	5.0	0	166.	42.	20.	0.3		11.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
2-14-73	65.	14.	23.	6.4	0	202.	61.	24.	0.4	.11	12.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
3-20-73	66.	12.	21.	6.2	0	188.	65.	28.	0.2		11.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
4-25-73	67.	16.	50.	7.0	0	190.	82.	69.	0.4		12.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
5-23-73	82.	13.	53.	5.8	0	207.	96.	80.	0.4	.12	12.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
6-20-73	78.	15.	44.	6.6	0	224.	87.	58.	0.4	.12	13.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
7-18-73	75.	21.	140	7.6	0	202.	138.	206.	0.4	.18	5.8										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
8-15-73	61.	9.7	29	5.5	0	183.	56.	35.	0.4	.14	9.1										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
9-5-73	88.	16.	93.	7.5	24	244.	110.	131.	0.3	.20	13.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
10-9-73	62.	11.	23.	8.5	0	185.	57.	26.	0.3	.12	12.										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50

Station: 203 Kansas River at Kansas City, Kansas KA 0.3, NE¼ Sec. 10, T11S R25E
On James Street bridge, ½ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage	Flow	Temp C.	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	Ag	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fec. Strep.
11-13-73	11:05A		44,300	12.	350.	7.8	420.	252.				152.	34.	118.	2.6		0.07			0.51	9.5	1.1				29000	1800	600
12-5-73	11:40A		61,800	3.	1100.	7.7	430.	244				160.	36.	124.	1.7		0.33			0.52	10.7	3.2				95000	16000	47000
1-16-74	11:35A		8,800	0.	25.	7.9	1040.	625.				365.	111.	254	3.8		0.64			0.79	12.2	1.0				2500	200	700
2-13-74	11:25A		16,200	4.	130.	8.0	870.	544.				322.	102.	220.	5.0		0.48			0.73	12.6	1.5				80000	120	500
3-13-74	11:10A		14,000	8.	250.	8.1	820.	491.				302.	90.	212.	5.8		0.37			1.90	10.3	2.6				52000	2300	1900
5-14-74			21,300	18.	1600	7.4	700.	413.				241.	77.	164.	3.4		0.22			0.56	6.5	6.4		0.00		190 000	13000	37000
6-11-74	10:40A		26,800	19.	2200	7.6	350.	212.	1976.	1764.	212.	140.	34.	106.	6.9		0.37			0.62	7.7	3.6	92.			70000	21000	30000
7-9-74	11:15A		25,500	29.	40	7.5	1080.	627.				263	137.	126.	0.1		0.13			0.32	9.0	6.0	31.			36000	2500	300
8-13-74	10:40A		3,580	26.	100	7.9	1180.	676.	106.	44.	62.	241.	105.	136.	0.2		0.12			0.41	7.5	6.3	31.			60000	3800	1600
9-10-74	11:05A		3,670	23.	170	7.9	1070.	614.	104.	56.	48.	299.	131.	168.	0.4		0.16			0.48	10.0	4.4	32.			26000	400	2500
10-15-74	11:20A		4,530	12.	200.	7.7	980.	576.				283.	135.	148.	6.0		0.84			0.70	7.8	5.0	29.			79000	5400	22000
11-12-74	11:30A		5,470	9.	160.	8.0	760.	462.				277.	81.	196.	4.4		0.36			0.75	9.8	2.2	19.			67000	2600	4500

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	
11-13-73	46.	9.0	24.	7.0	0	144.	51.	30.	0.4	.12	11.																		
12-5-73	51.	8.0	22.	5.5	0	151.	38.	30.	0.4	.09	12.																		
1-16-74	110.	22.	77.	7.0	0	310.	131.	105.	0.3	.12	16.										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50
2-13-74	101.	17.	60.	7.2	0	268.	126.	79	0.4	.12	16.										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50
3-13-74	88.	20.	58.	5.2	0	259.	97.	74	0.6	.12	13.										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50
5-14-74	72.	15.	51.	5.2	0.0	200.	86.	69.	.4	.11	10.										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50
6-11-74	46.	6.1	17.	3.4			36.	23.		.11	9.0		1.5	0.20	0.0	0.09	.000	0.00	0.00	0.00	L+0.5	L+0.5	L+1.0	L+1.0	L+0.3	L+1.0	L+1.0	L+10	L+50
7-9-74	61.	27.	126.	8.0			152.	175.		.09	1.3										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50
8-13-74	64.	20.	146.	8.8			145.	208.		.11	1.6										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50
9-10-74	82.	23.	102.	8.3			156.	140.		.12	1.3										L+0.5	L+0.5	L+1.0	L+10.0	L+0.3	L+1.0	L+1.0	L+10	L+500
10-15-74	74.	24.	96.	7.4			138.	135.		.11	6.0										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50
11-12-74	93.	19.	58.	5.9			94.	99.		.06	10.										L+0.5	L+0.5	L+1.0	L+10	L+0.3	L+1.0	L+1.0	L+10	L+50

Station: 203 Kansas River at Kansas City, Kansas KA 0.3, NE¼ Sec.10, T11S R25E
On James Street bridge, ¼ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	Gage	Flow	Temp C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD		Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fe Str
12-17-74	11:15A		3150	1.	15.	8.0	1130.	683.	65.			383.	121.	262.	3.0		0.60			0.86	12.3	1.0	12.			< 100	< 100	100
1-14-75	10:30A		3970	2.	15.	8.0	720.	424	78.			285.	73.	212.	3.5		0.72			0.72	13.2	1.5	17.			1600	400	3300
2-11-75	11:45A		3890	0.	25.	8.0	940.	546.	36.			322.	86.	236.	4.6		0.84			1.00	12.4	1.7	14.			17000	1800	4000
3-12-75	10:55A		3850	1.	45.	8.0	950.	564.	57.			325.	105.	220.	3.7		0.56			0.78	12.4	1.8	20.			< 100	< 100	500
4-8-75	10:50A		5750	8.	130.	8.2	730.	441.	112.			289.	85.	204.	4.2		0.32			0.77	9.8	2.7	22.			4800	500	4800
5-13-75	11:30A		4610	21.	140.	8.0	630.	370.	150.			210.	70.	140.	1.3		0.25			0.48	9.4	6.8	30.			6100	600	16000
6-10-75	11:00A		39300	21.	2000	7.8	430.	258.	1830.			176.	42.	134.	3.1		0.35			0.46	5.9	1.6	101.			62000	16000	3000
7-15-75	10:25A		8770	26.	240.	8.0	250.	442.	230.			240.	98.	142.	2.0		0.16			0.60	6.9	1.4	22.			28000	300	2100
8-12-75	10:50A		3730	27.	55	7.8	840.	477	45.			210.	76.	124	0.1		0.16			0.46	4.7	3.6	17.			2100	100	400
9-2-75	10:35A		3840	29.	130.	8.1	800	499.	90.			248.	84.	164.	3.6		0.28			1.4	6.3	3.7	18.			11000	100	600
10-11-75	11:15A		1280	15.	50.	8.6	1140.	673.	46.			312.	98.	214.	1.1		0.33			1.3	8.2	6.8	30.			3900	300	1200
11-2-75	11:43A		4690	6.	600.	7.7	460.	264.	404.			144.	46.	98.	5.4		0.80			0.75	9.6	2.0	37.			110000	6000	210000

Milligrams per Liter

Parts per Billion

Date	Ca	Mg	Na	K	CO_3	Alk	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	
12-17-74	114.	24.	92.	4.8		0.00	137.	134.		.18	11.	.39	0.16	0.00	0.0	0.00	.000	0.00	0.00	0.00	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
1-14-75	83.	19.	44.	4.0			80.	54.		.14	7.8										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
2-11-75	101.	17.	69.	4.2			108.	89.		.15	11.										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
3-12-75	94.	22	71.	4.8			137.	90.		.12	8.7										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
4-8-75	83.	20	46.	4.2			100.	53.		.11	7.6										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
5-13-75	61.	14.	47.	6.2			100.	54.		.08	1.6										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
6-10-75	56.	8.9	22.	4.0		0.00	53.	23.		0.15	7.5	2.2	0.00	0.10	0.0	0.06	.000	0.00	0.00	0.01	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
7-15-75	75.	13.	53.	4.0			131.	65.		0.12	8.6										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
8-12-75	58.	16.	83.	8.8			120.	109.		0.15	6.7										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
9-2-75	78.	13.	73.	9.2			117.	95.		0.15	10.										< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50
11-11-75	94.	19.	118.	7.8			145.	152.		0.06	6.4																		
12-2-75	46.	7.2	34.	6.8		0.00	56.	42.		0.09	8.2	1.5	0.10	0.01	0.0	0.00	.000	0.00	0.00	0.00	< 0.5	< 0.5	< 1.0	< 10	< 0.3	< 1.0	< 1.0	< 10	< 50

State of Kansas
Department of Health and Environment
Division of Environment

Station: 203 Kansas River at Kansas City, Kansas, KA-0.3, NE¼, NE¼, Sec.10, T11S, R25E, On James St. Bridge, ½ mile east of Interstate 70.

Milligrams per Liter / Counts per 100 ml

Date	Time	Gage T.D.	Flow	Temp °C	NTu	pH	Sp. Cond.	Tot D.S.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3 (N)	Ex-ALK	NH_3 (N)	TKN	TON	Tot P	DO	BOD_5	COD	Ag	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
5-11-77	11:15A	57.90	1280	21.	90.	7.7	680.	402.	80.			193.	53.	140.	1.3	0.	1.0			0.65	3.5	3.3	41.			6180000	17000	600
6-7-77	11:05A	55.70	9930	22.	890.	8.0	360.	231.	1080.			140.	26.	114.	1.2	0	0.14			1.30	5.8	3.9	93.	0.00		38000	5000	Lt 1000
7-13-77	11:20A	51.80	6450	28.	88	8.3	480.	325	118.			184	34.	150.	0.5	0	0.11			0.31	6.4	3.3	43.			32000	3400	400
8-10-77	11:[illegible]A	56.30	3120	[illegible]	120.	8.2	[illegible]0.	395.	100.			200.	56.	144.	0.6	0.	0.27			0.35	5.0	3.0	38.			28000	2800	Lt 100
9-13-77	11:50A	32.00	61400	19.	510	7.2	230	144.	1700.			112.	16.	96.	1.1	0.	0.33			1.4	5.7	6.0	106.			590000	30000	100000
10-12-77	11:30A	55.78	6660.	12.	90.	8.0	490.	381.	184.			187	45	142.	1.1	0	0.18			0.38	9.6	3.0	34			68000	4600	500
11-9-77	10:55A	47.90	38,2[illegible]	10.	400	7.7	400.	251.	888.			161.	31.	130.	1.1	0.	0.29			0.86	8.4	7.2	99	0.00		210000	15000	2000
[illegible]	[illegible]		6340.	[illegible]	[illegible]	[illegible]	[illegible]	114.	134.			232.	56.	182.	1.0	0.	0.33			0.31	12.6	3.0	21.			15000	2000	300
1-10-78	11:35A	55.85	3100.	-1.	20.	7.8	710.		38.			253.	62.	190.	1.1	0.	0.44			0.38	14.0	2.4	39.			6800	2300	200
2-22-78	11:30A	52.60	1700.	0.	6.0	7.8	1080.	650.	9.			367.	105.	262.	1.3	0.	1.1			0.45	11.6	1.8	8.			430	140	140
3-14-78	11:10A		23000	0	500	7.7	350.	218.	1400			148	36.	112.	1.8	0.	0.98			1.3	10.8	9.3	100.			23000	1000	Lt 1000
4-12-78	11:00A	[illegible]	2240	12.	350.	8.[illegible]	350	245.	1210.			165.	41.	134.	2.0	0.	0.42			0.92	—	6.0	134.			20000	1000	10000

Milligrams per Liter / Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Cr	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
5-11-77	56.	13.	63	7.6			91	75.		0.19	5.2																		
6-7-77	43.	8.0	19.	7.0	0.0	139.	47.	20.		0.13	9.1	0.15	0.02	0.02	0.05	0.05	.000	0.00	0.00	0.01									
7-13-77	54.	12.	28	6.9	0.0	183.	65.	29.		0.18	7.																		
8-10-77	55.	15.	55.	8.[illegible]	0.0	17[illegible].	84	77.		0.12	7.7										Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
9-13-77	38	4.7	10.	5.0	0.0	117.	26.	14.		0.23	10.										8-10-77	Atrazine		2.1					
10-12-77	51	11.	35.	6.1	0.0	173.	50.	31		0.31	10.																		
11-9-77	50.	8.9	17	5.5	0.0	15[illegible].	48.	32.		0.22	12.	0.12	0.00	0.04	0.14	0.08	0.000	0.00	0.00	0.00									
12-9-77	74.	13.	[illegible]	7.1	0.0	222.	51.	62.		0.31	13.																		
1-10-78	73.	14.	43	3.6	0.0	232.	36.	55.		0.24	12.																		
2-22-78	114.	20.	87	[illegible]	0.0	320.	140	103		0.23	15.																		
3-14-78	[illegible]	[illegible]	[illegible]	7.0	0.0	137	[illegible]	15		0.11	8.8																		
[illegible]	[illegible]	7.5	[illegible]	[illegible]	0.0	[illegible]	[illegible]	20.		[illegible]	10.																		

Station: 203 Kansas River at Kansas City, Kansas, KA-0.3, NE¼, NE¼, Sec10, T11S, R25E, On James St. Bridge, ¼ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter — Counts per 100 ml

Date	Time	Gage T.D.	Flow	Temp °C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	Ag	Oil & Gr.	Tot. Coli.	Fecal Coli.	Fecal Strep
2-9-77	11:50A	—	920.	3.	21.	8.0	1310.	808.	64.			383.	131.	262.	5.7		2.2			2.8	11.2	8.4	25.			<1 100	<1 100	100
3-9-77	11:30A	6.35	1100.	13.	40.	8.5	1110.	670.	60.			303.	91.	212.	7.5		0.72			2.1			30.			31000	3000	<1000
4-13-77	10:45A	5.95	1030.	18.	30.	8.4	1040.	630.	54.			289.	95.	194.	2.6		1.5			1.9	5.3	5.4	61.			14000	1200	300

Milligrams per Liter — Parts per Billion

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Hex. Cr.	Cd	As	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
2-9-77	109.	27.	138.	8.5			191.	159.		0.30	10.										<1 0.5	<1 0.5	<1 1.0	<1 10	<1 0.3	<1 1.0	<1 1.0	<1 10	<1 50
3-9-77	90.	17.	117.	7.1			154.	137.		0.19	7.0																		
4-13-77	78.	23.	114.	7.0			155.	129.		0.15	13.																		

Station: 201 Kansas River at Kansas City, Kansas KA 0.3, NE¼ Sec. 10, T11S, R25E, On James Street bridge, ¼ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per Liter

Date	Time	~~Gage~~ T.O	Flow	Temp °C	Tu	pH	Sp. Cond.	Tot Sol.	Tot S.S.	Fix S.S.	Vol S.S.	Hardness Tot	Hardness Non Carb	Tot Alk	NO_3	NO_2	NH_3	TKN	TON	Tot PO_4	DO	BOD_5	COD	Ag	Oil & Gr.	Counts per 100 ml Tot. Coli.	Fecal Coli.	Fecal Strep
1-6-76	11:40A	63.35	1050	1.	26.	8.0	940.	577.	12.			331.	83.	248.	4.1		1.7			1.9	11.4	2.8	12.			Gt 8000	12000	4800
2-11-76	11:45A	60.00	2390	6.	34.	8.1	1150.	694.	31.			342.	102.	240.	3.0		0.87			1.3	11.2	2.8	12.			8000	1000	40
3-10-76	11:35A	57.22	2760	9.	70.	7.5	810.	487.	53.			265.	83.	182.	4.2		0.57			0.73	10.1	2.8	15.			18000	9000	3800
4-7-76	11:00A	57.10	2280	19.	45.	7.9	920.	533.	60.			246.	88.	158.	2.6		0.14			0.87	11.3	7.3	27.			4000	Lt 100	1800
5-12-76	11:25A	53.80	14100	19.	500.	7.7	530.	329.	444.			209.	46.	163.	5.1		0.29			0.95	7.6	4.8	31.			51000	4500	28000
6-9-76	11:30A	57.05	3120	24.	70.	8.2	610.	372.	72.			210.	56.	154.	0.1		0.07			0.42	8.3	4.0	22.	0.00		2500	700	3100
7-6-76	10:55A	58.33	4470	23.	110.	7.9	570.	347.	124.			210.	54.	156.	2.9		0.13			0.53	6.1	3.0	20.			14000	800	700
8-11-76	11:15A	57.92	1360	29.	46.	8.0	910.	540.	40.			266.	86.	180.	0.9		0.09			1.1	5.0	4.5	24.			Gt 80000	Gt 60000	3400
9-8-76	11:30A	57.3	1020	26.	70.	7.8	1120.	653.	88.			229.	99.	130.	9.7		0.21			1.1	1.7	9.3	45.			Gt 80000	19000	200
10-13-76	11:55A	58.21	2660	18.	90.	8.0	1280.	725.	152.			249.	105.	144.	0.2		0.15			0.76	9.9	7.5	62.			3000	100	500
11-3-76	11:35A	58.25	1150	11.	55.	8.1	950.	566.	32.			274.	72.	202.	4.8		0.98			1.6	9.6	2.1	26.	0.00		22000	5000	Lt 1000
12-15-76	12:15P	58.35	900	0.	12.	8.1	1250.	760.	16.			349.	97.	252.	4.4		1.2			2.0	13.2	3.9	22.			5300	1500	1100

Milligrams per Liter

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	Cu	Pb	Zn	Hg	Cr.	Cd	As
1-6-76	98.	21.	74.	9.1			116.	88.		0.23	16.									
2-11-76	101.	22.	108.	8.3			167.	127.		0.24	12.									
3-10-76	75.	19.	65.	6.4			109.	89.		0.19	9.7									
4-7-76	64.	21.	93.	8.6			135.	112.		0.12	0.7									
5-12-76	61.	14.	29.	6.4			82.	25.		0.13	8.8									
6-9-76	58.	16.	43.	6.8			99.	44.		0.11	12.	0.10	0.47	0.00	0.0	0.00	0.000	0.00	0.00	
7-6-76	61.	14.	33.	7.5			89.	36.		0.04	9.5									
8-11-76	72.	21.	88.	11.			127.	104.		0.11	7.2									
9-8-76	54.	23.	137.	11.			173.	164.		0.19	1.8									
10-13-76	62.	23.	164.	9.6			167.	211.		0.13	0.5									
11-3-76	82.	17.	90.	8.2			128.	103.		0.22	10.	0.04	0.06	0.01	0.04	0.00	0.000	0.00	0.00	0.01
12-15-76	102.	23.	130.	8.8			176.	153.		0.28	10.									

Parts per Billion

Date	Aldrin	Dieldrin	Chlordane	DDT	Endrin	Heptachlor	Heptachlor Epox.	Lindane	Methoxychlor
1-6-76									
2-11-76									
3-10-76									
4-7-76									
5-12-76									
6-9-76	Lt 0.5	Lt 0.5	Lt 1.0	Lt 10	Lt 0.3	Lt 1.0	Lt 1.0	Lt 10	Lt 50
7-6-76									
8-11-76									
9-8-76									
10-13-76									
11-3-76									
12-15-76									

Station: 203 Kansas River at Kansas City, Kansas, KA-0.3, NE¼, NE¼, Sec.10, T11S, R25E,
On James Street Bridge, ½ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per liter — Counts per 100 ml

ate	Time	Gage T.D.	Flow	Temp °C	NTU	pH	Sp. Cond	Tot. D.S.	Tot. S.S.	Fix. S.S.	Vol. S.S.	Hardness Tol.	Hardness Carb	Hardness Non Carb	Tot. Alk.	NO_3 (N)	Ex. Alk.	NH_3 (N)	TKN	Ton	Tot. P	DO	BOD_5	COD	Oil & Gr.	Tot. Coli-	Fecal Coli.	Fecal Strep
7	11:45A	—	7480	15.	400.	7.3	410.	274.				177.	136.	41.	136.	1.7	0.	0.39			0.66	8.0	5.4	86.		9000	9000	20000
25	3:30A		9000	24.	490.	7.4	400.		1025			107.	107.	0.	120.	1.4	13.	0.40			0.31	4.9	2.8			113000	6700	3900
25	11:30A	5613	7720	31	71.	8.4	460.	316.	212			184.	146.	38.	146.	1.5	0.	0.30			0.37	10.1	3.3	48.		7000	1500	400
28	3:22P	—	13460.	25.	143.	7.7	400.	260.	208			148.	120.	28.	120.	1.8	0.	0.11			0.42	6.9	2.7	41.		51000	8000	5500
[illegible]	11:45A		1060.	25.	27.	7.9	760.	462.	50.			225.	170.	55.	170.	0.4	0.	0.32			0.56	2.5	3.9	34.		1200	500	200
11	11:55A	—	1540.	18.	40.	8.2	630	406	66			217	168.	49.	168.	1.4	0.	0.28			0.53	8.4	3.6	39.		37000	4000	10000
58	10:55A		1230	10.	18	8.3	570.	364.	50.			275	200.	75.	200.	0.9	0.	0.25			0.48	10.7	4.5	32.		6180000	12000	3400
5-11	11:45		4780	0	56	8.0	540.	330	166			202.	160.	42.	160.	1.8	0.	0.46			0.43	13.0	3.3	17.		6180000	54000	700
2-17-71	11:30A		1700.	3	35.	7.4	750.	537.	58.			306.	226.	80.	226.	1.3	0.	0.93			0.52	11.4	4.8	31.		67000	16000	5000
3-2-71	10:55A		26800	3	700.	7.6	430.	276.	1540.			168.	130.	38.	130.	2.3	0.	0.46			1.3	10.2	5.4	96.		7000	2000	8000
4-11-71	11:44A		42200.	8	300.	7.4	370.	235.	535.			145.	118.	30.	118.	1.9	0.	0.24			0.77	9.9	3.0	95.		13000	3000	11000
5-9-71	10:52A		12700	20.	200.	8.0	670.	416.	436.			232.	160.	72.	160.	1.5	0.	0.18			0.52	7.3	2.1	56.		21000	5000	2000

Milligrams per liter

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn					
5-10-71	53	11.	24.	5.6	0.0	166.	53	27		0.03	9.5																	
6-23-71	38	9			0.0	146	52.	35.						0.00		0.00	0.00	0.01	0.07	0.000		0.00	0.05					
7-27-71	59.	90	33.	9.6	0.0	178.	66.	40		0.00	5.3																	
8-24-71	45.	8.7		8.1	0.0	146	53.	33.		0.14	3.8																	
9-21-71	67.	14.	80	16.	0.0	207.	93	96		0.19	9.2																	
10-19-71	67.	12.	53.	9	0.0	205	84.	61.		0.13	11.																	
11-15-71	53.	11.	41.	9.3	0.0	241	118.	113.		0.17	9.3																	
12-13-71	41.	12.	38.	7.4	0.0	173.	74.	43		0.26	7.6																	
1-20-72	93.	15.	69.	6.4	0.0	276.	113.	85		0.18	12.																	
2-17-72	53.	8.7	20.	6.3	0.0	159.	63.	20.		0.14	13.	0.15	0.01	0.00	0.6	0.002	0.02	0.04	0.02	0.000	0.000	0.01	0.10					
3-16-72	46.	8.1	16.	5.7	0.0	144.	44.	19.		0.19	12.																	
4-19-72	70	14.	50	7.4	0.0	195	100.	60.		0.12	10.																	

Station: 203 Kansas River at Kansas City, Kansas, KA-0.3, NE¼, NE¼, Sec. 10, T11S, R25E, On James Street Bridge, ½ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per liter — Counts per 100 ml.

Date	Time	Gage-T.D.	Flow	Temp °C	NTU	pH	Sp. Cond	Tot. D.S.	Tot. S.S.	Fix. S.S.	Vol. S.S.	Hardness Tol.	Hardness Carb	Hardness Non Carb	Tot. Alk.	NO_3 (N)	Ex. Alk.	NH_3 (N)	TKN	Ton	Tot. P	DO	BOD_5	COD	Oil & Gr.	Tot. Coli-	Fecal Coli.	Fecal Strep
6-12-74	11:30A		3940.	23.	56.	8.1	750	438.	144.			250.	174.	76.	174.	1.8	0.	0.19			0.32	10.1	3.9	29.		15000	2000	LT 1000
7-18-74	11:15A	54.17	1860.	24.	200.	8.0	470.	281.	6.24.			177.	136.	41.	136.	1.6	0.	0.14			0.49	6.2	3.6	47.		24000	50000	1000
8-14-74	12:12P	56.90	3330.	24.	16.	7.9	710.	423.	46.			210.	140.	70.	140.	0.4	0.	0.25			0.20	6.4	6.6	26.		30000	43000	17000
9-12-74	10:55A	58.60	3510.	25.	40.	8.0	700.	365.	88.			172.	130.	42.	130.	0.1	0.	0.19			0.38	9.2	4.5	36.		67000	15000	6000
10-10-74	10:50A			16.	30.	8.0	1190.	700.	68.			313.	206.	107.	206.	0.6	0.	0.22			0.47	5.6	6.0	33.		16000	1000	LT 1000
11-6-74	10:50A	57.80		9.	900.	7.7	400.	243.	—			144.	114.	30.	114.	1.5	0.	0.30			—	10.2	4.2	—		27000	7000	17000
12-4-74	12:12P			3.	60.	8.1	680.	416.	94.			242.	184.	58.	184.	1.5	0.	0.45			0.34	13.9	1.5	32.		11000	2400	2200
1-21-80	11:30A	6.245		0.	40.	8.1	800.	434.	60.			274.	190.	84.	190.	1.9	0.	0.30			0.36	14.8	2.7	17.		5600	2300	700
2-20-80	11:40A	6.180		2.	19.	7.9	1030.	612.	43.			330.	226.	104.	226.	1.4	0.	0.53			0.31	13.7	3.0	30.		18000	3900	1900
3-12-80	11:30A	56.70		4.	24.	8.2	770.	458.	40.			266.	206.	60.	206.	1.7	0.	0.32			0.33	11.5	2.7	21.		36000	6000	4000
4-2-80	11:05A	53.30		8.	400.	7.8	350.	230.	2200.			144.	110.	34.	110.	2.6	0.	0.14			1.5	9.6	5.4	87.		14000	8000	58000
5-14-80	11:40A	58.05		18.	24.	8.4	710.	428.	92.			205.	122.	83.	122.	1.0	0.	0.00			0.26	10.6	4.3	37.		11000	800	1200

Milligrams per liter

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn					
6-12-74	77.	14.	54.	7.2	0.0	212.	105.	67.		0.06	1.																	
7-18-74	55.	11.	22.	7.7	0.0	166.	62.	23.		0.00	12.																	
8-14-74	61.	14.	64.	8.3	0.0	171.	101.	82.		0.10	6.																	
9-12-74	51.	11.	57.	6.9	0.0	159.	87.	69.		0.09	3.																	
10-10-74	91.	21.	124.	9.5	0.0	251.	159.	155.		0.18	8.																	
11-6-74	45.	7.7	31.	6.7	0.0	139.	46.	26.		0.22	16.																	
12-4-74	74.	14.	45.	7.5	0.0	224.	93.	53.		0.14	12.																	
1-21-80	82.	17.	54.	6.8	0.0	232	128.	61.		0.18	12.																	
2-20-80	96.	22.	82.	6.9	0.0	276.	145.	105.		0.17	12.																	
3-12-80	32.	15.	53.	6.3	0.0	251.	99.	60.		0.26	11.																	
4-2-80	45.	7.7	14.	5.0	0.0	134.	50.	14.		0.24	12.	0.46	0.03	0.01	0.8	0.002	0.00	0.03	0.03	0.000	0.000	0.00	0.09					
5-14-80	54.	17.	61.	7.1	0.0	149.	131.	77.		0.14	2.																	

Station: 203 Kansas River at Kansas City, Kansas, KA-0.3, NE¼, NE¼, Sec.10, T11S, R25E,
On James Street Bridge, ¼ mile east of Interstate 70.

State of Kansas
Department of Health and Environment
Division of Environment

Milligrams per liter — Counts per 100 ml

Date	Time	Gage T.D.	Flow	Temp °C	NTU	pH	Sp. Cond	Tot. D.S.	Tot. S.S.	Fix. S.S.	Vol. S.S.	Hardness Tol.	Hardness Carb	Hardness Non Carb	Tot. Alk.	NO_3 (N)	Ex. Alk.	NH_3 (N)	TKN	Ton	Tot. P	DO	BOD_5	COD	Oil & Gr.	Tot. Coli-	Fecal Coli.	Fecal Strep
6 11 80	11:33A	54.20		22.	142.	8.3	580.	342.	432.			210.	162.	48.	162.	1.8	0.	0.10			0.47	7.5	4.8	47.		10000	1000	LT1000
7 16 80	11:30A	54.40		32.	37.	7.9	1090.	630.	112.			242.	150.	92.	150.	0.8	0.	0.24			0.41	4.2	4.8	33.		600	950	1200
8 12 80	11:20A	57.23		30.	50	7.8	1060	545	92			217.	144.	73.	144.	0.9	0.	0.14			0.61	6.8	6.3	41.		20000	3000	1000

Milligrams per liter

Date	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	F	B	SiO_2	Fe	Mn	As	Ba	Cd	Cr	Cu	Pb	Hg	Se	Ag	Zn
6 11 80	61.	14.	35.	6.9	0.0	198.	70.	38.		0.14	10.												
7 16 80	64.	20.	122.	8.3	0.0	183.	147.	167.		0.15	7.												
8 12 80	54.	17.	106.	8.7	0.0	176.	122	136.		0.14	4.												

APPENDIX D

PRAIRIE-DELAWARE PLANNING POLICIES

APPENDIX D

PRAIRIE-DELAWARE PLANNING POLICIES

The Prairie-Delaware Master Plan was developed from a set of well-recognized land use planning policies which originate from analyses and projection of many factors influencing the nature and direction of urban change. Considered together, these factors produce the following basic conditions that govern the Master Plan.

Access: An existing pattern of major streets clearly dictates access to the area. The highest accessibility lies in and adjacent to the area generally bounded by Parallel Parkway, State Avenue, 90th and 118th Streets. This area has direct access to proposed I-435 and is served by the only continuous major north-south and east-west routes in the area (State, Parallel, 110th (Hutton) and 98th/99th).

Utility Service: A pattern of existing and planned utility services clearly delineates areas that may be expected to have sewer and other vital services. This area is bounded by ridge lines lying generally along 118th and 115th Streets on the west, and the locations of treatment plants in the vicinity of Donahoo and Leavenworth Roads on the north. Areas to the east and south of these limits likewise have, or will soon have, sewer and other services available. Access to such services, especially sanitary sewer lines, will be a major inducement to development.

Buildable Terrain: The type and location of development that can be accommodated in the area is constrained by topographic conditions. A corridor of relatively level land extends along State Avenue and Parallel Parkway from the west city limits east to about 90th Street. Land with slopes of less than 10%, which is generally suitable for a broad range of uses, predominates. Steep slopes, (in excess of 10%) occupy much of the areas north of Leavenworth Road and south of Interstate 70.

Existing Land Use: Existing land uses will affect the future of the area in various ways. Much of the land is in wooded or agricultural use and is highly vulnerable to change. In addition, large land areas have steep slopes and are lacking in foreseeable sewer service. Substantial acreage is also in active agricultural use, most of which can be easily displaced by spreading urbanization if the market justifies. Scattered dwellings on lots of widely varying sizes establish the use and character of many portions of the area. In certain sections, particularly along major highways, these ownerships are vulnerable to change to commercial and other non-residential uses. Heavier concentrations of housing in several scattered subdivisions pinpoint areas that call for protection, certain urban services and in some cases expansion into larger neighborhoods. Several urban type residential subdivisions have reached the plat stage but have not yet appeared on the ground.

Together these factors create a pattern which predetermines much of what can happen in the study area and, in a sense, dictate the major features of the Master Plan.

The City's Comprehensive Plan update for this area suggests a series of underlying policies whose purposes include the following:

1. to manage growth; buffer different areas and land uses;

2. to prevent sprawl, leapfrog and premature development;

3. to build a good tax base in areas suitable for non-residential development;

4. to protect rural-residential areas and to maintain rural quality of life in those areas to the extent possible;

5. to promote high-quality development;

6. to insure sound development of area that represents the last growth opportunity for KCK;

7. to insure a positive fiscal and economic impact;

8. to preserve important environmental features;

9. to insure that capital improvements are provided efficiently; and

10. to insure that planning and plan implementation are coordinated with each other and with County planning.

In furtherance of the policies, the plan divides the planning area into three tiers with distinct land use and development opportunities to be provided in each and with the standard residential and rural-residential areas demarcated by an urban-rural services area line. The three tiers, their characteristics and planned implementation mechanisms in each are as follows:

(1) Central, High-Intensity Core Area

- non-residential and multi family uses;
- served by all public facilities, utilities, etc.
- based on detailed 1" to 500' plan
- require all development to be in "planned" districts, linked to detailed plan
- opportunity for office, commercial and industrial development to support tax base

(2) Standard Residential Area

- single-family residential
- public facilities and utilities to be provided, but over time
- timing and sequencing
- adequate public facilities
- cluster of areas close to rural residential areas for buffering purposes

- use of cluster and "planned" districts to preserve open space and drainage ways and for areas adjacent to RR right-of-way

(2a) Urban Rural Demarcation Line

- divides standard residential from rural residential areas
- delineates outer boundary of area that will be served by urban-level services
- delineates area beyond which rezonings to higher intensities will not occur
- no change without change to master plan

(3) Rural-Residential Area

- single-family, but on large lots
- no public sewer and water services
- rural development standards for streets, subdivisions, etc.
- allow rural cluster
- will require cooperation with County

These plan implementation features and mechanisms will insure that policies stated and land uses proposed in the plan will actually be achieved; that adequate protection and buffering is provided; that strip commercial development is deterred; that "planned" rather than haphazard development occurs; and that the plan will be meaningful and will be given legal effect.

In addition to these plan concepts and implementation measures, the following measures will be embodied within the plan:

1. A schedule detailing the relationship of zoning to the Comprehensive Plan and what constitutes compliance with the Plan;

2. A recommended schedule of appropriate transitional land use relationships;

3. A schedule of minimum acreages to be considered for rezoning to non-residential districts. This would encourage the accumulation of larger tracts for development, help avoid strip and spot development patterns, and save the industry reserve areas for major development;

4. A policy which details a procedure limiting zoning and plat approval of urban density land uses to areas with available sewers or to situations where binding arrangements can be made assuring that no development will occur until adequate wastewater collection and treatment facilities are construed.

Other general measures that will be examined City-wide, but which have specific relevance to Prairie-Delaware plan implementation are as follows:

1. Updating of procedures and upgrading of design standards for the "E-1" Office and Professional District. These changes

would add to the City's control while also allowing the flexibility necessary for innovative development.

2. Review of densities permitted and standards for mobile home parks to assure that they are in line with the objectives of the plan and the community.

3. Consideration of proposals to make the area designated for high intensity land use (industrial, office, commercial, higher density residential) on the Prairie-Delaware Master Plan a special development area subject to special procedures and standards as has been done with the Parallel Parkway Plan area.

4. Increased priority will be given to capital improvements programming to facilitate achievement of both developmental and fiscal community goals.

5. In line with a solar access policy to be internal to the plan, consideration will be given to measures that would help preserve solar access.

Following the recent cases of Golden v. City of Overland Park, 224 Kan. 591, 584 P. 2d 130 (Kan. 1978) and Security National Bank v. City of Olathe, 225 Kan. 220, 589 P. 2d 589 (1979), an adopted comprehensive plan in Kansas has an enhanced legal status and effect in and of itself as well as for guiding plan implementation. Further, in Kansas, zoning that is in accordance with the comprehensive plan is statutorily (see K.S.A. 12-708) given a presumption of "reasonableness", while zoning in conflict with the comprehensive plan is suspect (see Golden and Security National Bank, supra). The Kansas Supreme Court, in Golden, stated as follows:

> "[T]he legislature has stressed the making of such plans and we believe they should not be overlooked when changes in zoning are under consideration."

The City of Kansas City, Kansas, intends to use the plan both affirmatively, to guide the various plan implementation measures cited herein, and, negatively, to prevent any zoning or land use changes that would conflict with the adopted plan.

The basic plan for the Prairie-Delaware area (which includes the project area) can be described as having three groups or tiers of land uses. Each of these, along with principle subdivisions, is described briefly below.

The Industrial-Commercial Corridor: The land lying generally between and adjacent to Parallel Parkway and State Avenue from 98th to 126th Streets should be developed for a variety of industrial, commercial, business service, office and higher density housing purposes which, taken together, will constitute a major new concentration of economic activity and tax base for the study area and for Wyandotte County. The use of land in this area should capitalize on the enormous investment in highways, rail and sewer services which are underway or are planned, as well as on the physical suitability of the land. The filling out

of these land areas will, of course, generate jobs and new investment which will, in turn, help to strengthen the economy of the county and the city.

Overall objectives for this area include assuring continued good access to I-435 and the major street system serving the area. Adequate rights of way must be acquired in the subdivision and zoning process in order to provide ample space for vehicular movement, necessary turning lanes, etc., as well as attractive landscaping. Access to major streets including State Avenue, Parallel Parkway, 110th and 98th, should be carefully limited so that through traffic can move with safety and efficiency.

Because of the high accessibility of this intensive corridor and its predominantly commercial and industrial character, it should also be used to meet the major service and retail needs of this portion of the county. Retail, office and service establishments should be located and designed to blend with and enhance the desired overall character of the area, including the avoidance of harsh confrontations along major streets and with other land uses. Business activities should be clustered and should observe the same high standards of site design and access in relation to streets and other land uses as are applied to industrial, office and residential functions.

The industrial-commercial corridor contains four basic types of land use or development districts. These may accommodate compatible and somewhat overlapping types of land uses, as follows:

Rail oriented industry: Heavy investments are being made to provide rail service to the area. The availability of good highway access, and the availability of some good, well-located land which can be given rail service, suggest that an industrial area for rail-oriented industry be developed as an extension of the proposed General Motors Plant site. This would occupy a major portion of the area bounded by Parallel Parkway, State Avenue, 110th Street, and I-435. The exact configuration of the area to be developed for this purpose will depend on detailed site planning and engineering related to topography and the design criteria of rail and road access. Vehicular access would be provided from 110th Street, Parallel Parkway, and State Avenue by way of collector streets. Buffer landscaping should be provided along Parallel Parkway and 110th Street, and access to these streets should be controlled to avoid conflicts and to protect their capacity and safety.

First priority in the use of this area should be given to industries that need and will use rail service. However, industries that transport, use or generate substances that are noxious or explosive to a degree that would endanger persons or property in adjacent areas should be excluded.

Office, Light Industry, and Commercial Services: Three portions of the area should be designated for office, light industrial and commercial service use. Each of these areas should be developed on a "planned

zoning" basis, with construction permitted only pursuant to the approval of plans for tracts or combinations of parcels totalling perhaps forty acres or more, showing how access, streets, buffering, drainage, the arrangement of land uses, and land subdivision are to be provided. Review and approval should be through the "planned unit development" process administered by the City, (or County where applicable).

Although the mix and scale of functions in these areas should vary somewhat based on market, locational and topographic conditions, "Industrial-Agricultural Reserve District". It should be preserved in its current state until such time as viable markets and proposals emerge which can make effective use of significant portions of the area and which can justify the provision of sewerage and other public services. In general, it is intended that this area be used to accommodate the needs of office and industrial activities that require large sites, with good visibility from State Avenue and Parallel Parkway, and an "open" rural setting.

Office and Business Services: Areas closest and with good access to I-435 should be used for a variety of compatible functions that can benefit from proximity to and visibility from this regional highway. These include offices, motels, commercial recreation, restaurants, higher density housing, and auto-oriented services. Relatively high minimum standards should be established for the sizes of parcels to be approved for development, and development plans should show how affected existing properties will be dealt with either through buffering or removal. Residential development should be large enough scale to create its own living environment and should be planned to avoid conflicts with other nearby uses. Development should occur primarily through the city's Planned United Development process.

The areas designated for this office-service type development extend from State Avenue to Parallel Parkway and 98th Street to the vicinity of 104th Street; the south frontage of State Avenue from about I-435 to 110th Street, and the north frontage of Parallel Parkway between I-435 and 110th Streets. The western ends of the two latter areas could be used for neighborhood retail centers if market demand justifies, as indicated below.

Neighborhood Retail Areas: Three areas within or adjacent to the Industrial-Commercial core are designated for neighborhood retail use. These locations include one quadrant on each of the intersections of 110th Street and Parallel Parkway, 98th Street and Parallel Parkway, and 110th and State Avenue.

Altogether, about 2,300 acres of land are located in the Industrial-Commercial core. These include:

740 Acres	Industrial, Rail
1,280	Industrial, Office (Including 360 acres in reserve)
500	Office Business Service
143	Neighborhood Retail

Together these constitute a major center for business and economic development which are sorely needed to strengthen and balance the economy of Wyandotte County.

Residential Neighborhoods: The study area is planned to provide four residential areas or "neighborhoods". These should encompass and expand on the residential development which already exists in the area and should be confined to areas that are mainly served with sewerage systems.

Densities and structure types in these areas will no doubt vary to reflect the real estate market, differences in topography, the availability of utilities, access, the size of existing parcels, and proximity to the Industrial-Commercial corridor. In general, they should be "standard" single family subdivision ranging in density from two to four dwellings per acre. Variations in density and "clustering" should be encouraged where problems of site utilization, drainage, impact of heavy traffic or other influences can be mitigated. Moderate densities which permit the development of duplex, apartment and town houses, should also be encouraged where such transitional relationships can bridge the gap between commercial and single family district.

Based on the degree of analysis possible in general planning, several portions of these neighborhoods have been designated for medium density development. These include bordering proposed industrial-office districts and office-business service districts, east of the suggested neighborhood retail center southeast of 98th Street and Parallel Parkway, and along the south edge of State Avenue, between 110th and 118th Streets.

Totally, about 19,300 acres are designated for residential use. This includes about 5,000 acres for varied urban, single-family housing. This quantity of land is several times the amount projected to be needed in the next twenty years. Thus, land areas indicated should provide ample competition, flexibility and choice to developers, homebuilders and their ultimate customers.

Agriculture and Rural Residence: The bulk of the study area is proposed for agricultural and rural residence use. Most of this category lies in the unincorporated portion of Wyandotte County. This includes almost all lands west of 115th Street and north of Parallel Parkway. This land area does not have foreseeable sewerage and the extension of an urban level of services would most likely represent an unwarranted and inefficient public expense. Substantial portions of this area are occupied by scattered homes on lots of relatively large size. Because much of the terrain is reasonably level, at least in the center portion of this area, it also contains substantial amounts of tillable land making up virtually all that remains in the county outside of river flood plains.

APPENDIX E

ECONOMIC AND FISCAL IMPACTS OF THE PROPOSED ACTION

CITY OF KANSAS CITY, KANSAS
DEPARTMENT OF BOULEVARDS, PARKS AND STREETS
ONE CIVIC PLAZA • 701 NORTH 7TH STREET, 66101 • 371-2000
L. R. ZAHNTER, COMMISSIONER

MEMORANDUM

TO: Gilbert A. Pintar
Director
Physical Planning Department

FROM: Lew Levin
Research Coordinator
Information and Research Department

DATE: February 25, 1981

SUBJECT: Fiscal Impact to Kansas City, Kansas, of Administrative Charge to General Motors

General Motors has agreed to pay the Port Authority $53,450,000 over twenty years as an administrative charge payment. Table 1 shows the annual payments during this period.

Current legislation before the Kansas State Legislature mandates that payments made to the Port Authority be allocated to government jurisdictions based on their relative share of the property tax levies of the affected governmental units.

Table 2 provides estimates of the amount of revenue each governmental jurisdiction will receive over the twenty year period based on current tax levies. The Bonner and Piper School Districts are treated as one entity, due to the fact that the County Appraiser will make final determination of how these school districts will share the administrative payment.

Table 2 indicates that Kansas City, Kansas, will receive $22,791,080 over the twenty year period, based on current tax levies. This total could change as the tax rates of the jurisdictions vary during this twenty year period. Of the $22,791,080, Kansas City, Kansas, will receive approximately $19.4 million (or 85%) during the final ten years.

In a previous report (2/6/81) Fiscal and Economic Impacts Associated with Proposed G.M. Relocation, it was shown that the G.M. plant will have a positive fiscal impact prior to the consideration of administrative charges. The additional estimated total of $22,791,080 to Kansas City, Kansas, in administrative charges will only add to the positive fiscal impact.

LL/ck

TABLE 1

Administrative Charges

Year	Charge
1981	$ 0
1982	0
1983	250,000
1984	500,000
1985	1,150,000
1986	1,150,000
1987	1,250,000
1988	1,250,000
1989	1,250,000
1990	1,250,000
1991	1,700,000
1992	4,300,000
1993	4,900,000
1994	4,900,000
1995	4,900,000
1996	4,900,000
1997	4,900,000
1998	4,900,000
1999	5,000,000
2000	5,000,000
	$53,450,000

TABLE 2

Distribution of G.M.'s
Administrative Charge Among Jurisdictions

Jurisdiction	1980 Tax Rate Per $100 of Assessed Valuation	Percent of Total	Estimated 20 Year Distribution
Kansas City, Kansas	$ 5.8461	.4264	$22,791,080
Wyandotte County	1.6626	.1213	6,483,485
Kansas City, Kansas Community College	0.6630	.0484	2,586,980
State of Kansas	0.1500	.0109	582,605
Bonner and Piper Area School Districts - Weighted Average*	5.3874	.3930	21,005,850
TOTAL	$13.7091	100%	$53,450,000

*Footnote to Table 2

The proposed General Motors site is located in both the Bonner Springs and Piper School Districts, approximately 71.43 percent in Bonner, and 28.57 percent in Piper. The railroad yards to the G.M. plant are located in the Piper School District and are not part of the administrative charge. The present tax rates for the school districts are Bonner (U.S.D. 204) - $4.9747, and Piper (U.S.D. 203) - $6.4193. The $5.3874 weighted tax rate was computed by weighting the tax rates of the two tax districts by the relative portion of the site located in each taxing district.

Weighted Tax Rate = $4.9747 (.2857) + 6.4193 (.7143) = $5.3874

This is only an estimate of the total revenue to be received by the school districts. The County Appraiser will make final determination of how the school districts' share will be computed and allocated.

CITY OF KANSAS CITY, KANSAS
DEPARTMENT OF BOULEVARDS, PARKS AND STREETS
ONE CIVIC PLAZA • 701 NORTH 7TH STREET, 66101 • 371-2000
L. R. ZAHNTER, COMMISSIONER
WATER POLLUTION CONTROL DEPARTMENT
INFORMATION AND RESEARCH DIVISION

February 6, 1981

M E M O R A N D U M

TO: Gilbert A. Pintar, Director, Physical Planning

FROM: Lew Levin, Research Coordinator
Information and Research Division

SUBJECT: Economic and Fiscal Impacts Associated with the Proposed Relocation of the Fairfax General Motors Plant

The following comments and attached tables address fiscal and economic impacts associated with the proposed relocation of the Fairfax General Motors plant. The focus of the analysis is upon impacts to Wyandotte County and Kansas City, Kansas. The tables were prepared by Scott Ramsey and myself from Information and Research with support from Dean Katerndahl and Midge Nutman of the Economic Development Department.

Tables 1-4 examine impacts associated with the vacating of the Fairfax G.M. plant. Tables 5-8 review impacts attributable to the proposed 110th and State site. The fiscal impact to BPU of the proposed relocation is presented in Table 9. Detailed footnotes follow the tables explaining assumptions used in the analysis.

The analysis of impacts resulting from the closing of the G.M. Fairfax plant is relevant to the rezoning of the 110th and State site for several reasons. The closing of the Fairfax plant has severe economic and fiscal implications to the City, and the 110th and State site must therefore be evaluated in the context of how it minimizes or eliminates these impacts while at the same time provides additional or increased positive fiscal and economic benefits.

Impacts Associated with Vacating G.M. Fairfax

Table 1 presents data on real and personal property tax revenues (existing and if vacated)by government entity for the Fairfax plant.

Presently, G.M. pays $1,732,341 in these taxes. The City receives $767,222 of this total. If vacated, after two years, it was estimated that G.M.'s payment would decline approximately $1.34 million, with the City loss being about $594,000. In terms of taxes, the overall rate would require a 56 cent increase while the City levy would require an 18 cent increase, based on 1981 tax rates.

Table 2 examines other non-property tax revenues received by the City from the Fairfax facility. This table indicates that the City would lose an additional $270,000 from these other sources (primarily BPU and sewer service charges).

Table 3 looks at the Fairfax plant's importance in terms of jobs to Wyandotte County and its residents. The Fairfax plant accounts for 6.2 percent of the jobs in Wyandotte County. Approximately 1.7 percent of Wyandotte County's employed residents (1,325) work at the G.M. Fairfax plant. The 1980 average monthly unemployment rate in Wyandotte County was 7.7 percent, and would increase further if the plant moved from the metropolitan area.

Manufacturing employment provides a major share of the economic base of a community. Studies have shown that manufacturing jobs create other jobs. Commercial development will often locate to serve the labor force or population employed in manufacturing jobs.

In table 4, metropolitan "multipliers" were applied to estimate the total jobs and amount of income generated by the GM (both directly and by spin-off effects) from the Fairfax facility in Wyandotte County. The estimates indicate that the Fairfax facility is responsible for 3,861 jobs and $80,818,985 in income to Wyandotte County residents. This income becomes $49,057,124 in local sales, and provides $444,212 in sales tax revenue to Wyandotte County residents. To replace this sales tax revenue with property tax revenues would require a 13 cent increase in the current City property tax levy.

IMPACTS ASSOCIATED WITH THE PROPOSED 110TH AND STATE AVENUE SITE G.M. PLANT

Table 5 presents property tax revenues by jurisdiction projected for the 110th and State site. The tax revenues will be limited to personal property inventory and railroad taxes. G.M. will pay a negotiated administrative charge in lieu of property taxes on their land, improvement, and equipment. The projected property tax revenue is about $507,000 annually. The City share of the revenue is $215,354. This amount of revenue could reduce the current City tax levy by $0.0624. The tax impact to the Bonner Springs and Piper School districts would be more substanstial, -$0.7553 and -$0.5625 respectively.

Table 6 examines in detail City revenues and costs. Cost and revenue estimates after 1983 were made using 1983 dollars and were not adjusted further for inflation. In determining costs major City Departments were contacted and asked to provide information on additional expenses projected as a result of the proposed G.M. plant. In the case of the Police and Fire Departments, the additional expenses attributed to G.M. decline over the twenty year period, because improvements in public safety had been planned for this area of the City in the next five years, due in part to I-435 impacts and the recent increases in population in this area of the City (See footnotes 40-a, and 40-b, for further discussion.). Table 6 indicates that the City revenues associated with the proposed plant will exceed City costs on an annual basis by $181,214 even without including the City's share of the administrative charge. Final terms of the administrative charges are still being negotiated, but at the minimum G.M. will pay over $50 million in twenty years as an administrative charge. A distribution method for this charge among jurisdictions still needs to be finalized.

The primary reason the City was able to limit its operating costs is the UDAG grant the City has received. (See Table 8.) This grant provides federal funding for the

major intrastructure improvements (streets, sewers, and the fire station). Rather than paying for these improvements by increasing the City's debt. service requirements, the City's costs are reduced substanstially, by means of a federal grant. It should also be mentioned that the main sewer lines provided for in this grant will not be limited strictly to G.M., as the City will be able in the future to connect lateral sewer lines to the main trunk line, to provide sewer service to the "Little Turkey Creek" drainage basin.

In addition to the fiscal impact, the proposed G.M. plant at 110th and State will have several important economic impacts. The Fairfax labor force of 5,300 will remain in Wyandotte County and an additional 700 employees are planned for the plant's operation. Table 7 shows the plant's impact to Wyandotte County residents. In terms of jobs, 1,500 from Wyandotte County are estimated for the plant and an additional 2,872 secondary jobs are generated. Total direct and secondary income to Wyandotte County residents amounts to $91,493,191. This income represents $55,536,367 in personal consumption expenditures, and this in turn generates $555,364 in sales tax revenue to the County ($502,882 to the City).

The proposed plant will also provide a stimulus to the local construction industry during plant construction. The Draft Enviornmental Impact Statement for the proposed plant relocation indicates an average of 625 construction jobs per year with a peak employment of 2,000 occurring during the construction two-year timeframe. However, the Draft E.I.S. does not estimate the portion of the construction to be Wyandotte County residents.

In evaluating the fiscal impact of the proposed plant, consideration was also given to the plant's projected impact to B.P.U. Table summarizes B.P.U. fiscal projections concerning the plant. The table indicates that B.P.U. expects a net gain in revenues of approximately $2,000,000 annually resulting from the plant.

CONCLUSION

The proposed rezoning of the 110th and State site for General Motors will result in a positive fiscal and ecnonmic impact to the City of Kansas City, Kansas.

The proposed plant enables the City to retain a major employer and avoid the adverse impact of substanstial losses in jobs, income dollars and retail sales.

In terms of fiscal impact, the G.M. plant has a positive fiscal impact, even before administrative charges are considered. However, the exact magnitude of the impact cannot be computed until final administrative charges and distributions are determined.

TABLE 1

IMPACT OF VACATING FAIRFAX
ON REAL/PERSONAL PROPERTY TAX REVENUE

JURISDICTION (TAX RATE/$100)	EXISTING (1981) [1]		VACANT FACILITY (1986) [2]		REVENUE LOSS [3]		ANNUAL IMPACT ON TAX RATE [4]
	REAL	PERSONAL	REAL	PERSONAL	REAL	PERSONAL	
Kansas City, Kansas (5.8461)	$256,677	$510,545	$172,833	$0	$83,844	$510,545	+ $0.1807
Wyandotte County (1.5954)	70,047	139,328	47,166	0	22,881	139,328	+ 0.0461
U.S.D. 500 (4.4677)	196,158	390,168	132,083	0	64,075	390,168	+ 0.2130
KCKCC (0.6630)	29,110	57,900	19,601	0	9,509	57,900	+ 0.0192
State of Kansas (0.1500)	6,586	13,100	4,434	0	2,152	13,100	+ 0.0043
Fairfax Drainage District (0.4825)	21,185	42,137	14,265	0	6,920	42,137	+ 0.0988
TOTAL (13.2047)	$579,763	$1,153,178	$390,382	$0	$189,381	$1,153,178	+ $0.5621

Total Tax Revenue Loss, Ten Year Period (1983-1992)[5] = $10,551,091

TABLE 2

IMPACT OF VACATING FAIRFAX
ON CITY OPERATING REVENUES

TYPE	EXISTING (1981)[1] REVENUE	ANTICIPATED (1986)[2] REVENUE	REVENUE[3] LOSS
s Franchise[6]	$37,350	$0	$37,350
elephone Franchise Tax[7]	230	0	230
P.U. Payments[8]	102,720	0	102,720
wer Service Charges[9]	120,000	0	120,000
icense Fee[10]	600	0	600
ity-County Revenue Sharing[11]	5,595	1,260	4,335
A.V.T.R.[11]	10,323	2,325	7,998
TALS	$276,818	$3,585	$273,233

Total ten year revenue loss, 1983-1992[12]: $2,326,301

Total ten year revenue loss, 1983-1992, less sewer service charges[13]: $1,196,301

Average Annual impact on City tax rate[14]: $.0352

TABLE 3

G.M. FAIRFAX PLANT'S SHARE OF
WYANDOTTE COUNTY'S EMPLOYMENT, LABOR FORCE,
AND HOUSEHOLDS

CATEGORY	TOTAL	G.M. FAIRFAX EMPLOYMENT WYANDOTTE COUNTY RESIDENTS	
		NUMBER	PERCENT OF TOTALS
G.M. Fairfax Employment[16,17]	5,300	1,325	25.0
Wyandotte County Employment[18] (Fairfax Share)	85,628	1,325 (5,300)	1.6 (6.2)
Wyandotte County Employed Civilian Labor Force[19]	78,163	1,325	1.7
Wyandotte County Households[20]	63,851	1,325	2.1

TABLE 4

G.M. FAIRFAX PLANT
DIRECT AND SECONDARY IMPACTS-EMPLOYMENT, INCOME, AND SALES

G.M. FAIRFAX PLANT'S IMPACT TO WYANDOTTE COUNTY RESIDENTS	TOTALS
(A) Jobs	
(1) G.M. Fairfax Plant[16]	1,325
(2) Secondary Jobs Generated[21]	2,536
(3) Total Jobs	3,861
(B) Income	
(1) G.M. Fairfax Plant[22]	$25,471,800
(2) Secondary Income Generated[23]	$55,347,185
(3) Total Income	$80,818,985
(C) Expenditures and Sales	
(1) Estimated Personal Consumption Expenditures[24]	$49,057,124
(2) Estimated Sales Tax Revenue to Wyandotte County[25]	$490,571
(a) Kansas City, Kansas Share of Revenue[26]	$444,212
(b) Annual Impact to City Property Tax Rate Without this Revenue[27]	+$0.131

TABLE 5

IMPACT OF THE NEW GM PLANT
ON PROPERTY TAX REVENUES

BY TAX	1986	TEN-YEAR TOTAL, 1983-1992	ANNUAL IMPACT ON TAX RATE[30]
Personal Property/Inventory[28]	$450,134	$3,376,005	
Railroad Taxes[29]	56,595	565,950	
*TOTAL	$506,729	$3,941,955	
By Jurisdiction (Tax rate/$100):			
Kansas City, Kansas (5.8461)	$215,354	1,664,075	- 0.0635
Wyandotte County (1.6626)	62,636	487,160	- 0.0173
U.S.D. 204 (4.9747)	152,023	1,145,375	- 0.7553
U.S.D. 203 (6.4193)	45,671	402,965	- 0.5625
KCKCC (0.6630)	24,977	194,260	- 0.0069
State (0.1500)	5,652	43,960	- 0.0016
Prairie Township (0.4969)	416	4,160	- 0.0117

TABLE 6

IMPACT OF THE NEW GM PLANT
ON KANSAS CITY'S REVENUES/COSTS

	ANNUAL REVENUE/COST	TWENTY-YEAR TOTAL,[41] 1983-2002
A. REVENUES		
1. Personal Property Tax	$195,786	$3,426,255
2. Railroad Tax	19,568	391,360
3. Gas Franchise Tax[31]	62,000	1,178,000
4. Telephone Franchise Tax[32]	8,700	160,950
5. B.P.U. Payments[33]	214,000	3,973,597
6. Sewer Service Charges[34]	240,000	4,660,000
7. License Fees	600	11,700
*SUBTOTAL	$741,443	$13,801,862
B. COSTS		
1. General Obligation Gond Projects[35]	$63,594	$1,271,880
2. Fire Department	284,625[40A]	5,692,500
3. Police Department	112,000[40B]	2,240,000
4. Public Transportation[36]	100,000	2,000,000
*SUBTOTAL	$560,219	$11,204,380
C. ADMINISTRATIVE CHARGE[37]	NA	NA ($50 million plus, to all governmental entities)
D. "ONE-TIME" REVENUES		
1. Building Permit[38] ($435,000)		
2. Sewer Connection Fee[39] ($129,500)		

TABLE 7

G.M.'S 110TH AND STATE SITE
DIRECT AND SECONDARY IMPACTS-EMPLOYMENT, INCOME, AND SALES

G.M.'s 110th and State Site Impact to Wyandotte County Residents	Totals to Wyandotte County
A. JOBS	
1. 110th and State[42]	1,500
2. Secondary Jobs Generated[21]	2,872
3. Total Jobs	4,372
B. INCOME	
1. 110th and State[43]	$28,836,000
2. Secondary Income Generated[44]	$62,657,191
3. Total Income	$91,493,191
C. Expenditures and Sales	
1. Estimated Personal Consumption Expenditures[24]	$55,536,367
2. Estimated Sales Tax Revenue to Wyandotte County[25]	$555,364
a. Kansas City, Kansas Share of Revenue[45]	$502,882
b. Annual Impact to Kansas City, Kansas Property Tax Rate[46]	-$0.148

TABLE 8

GENERAL MOTORS RELOCATION
URBAN DEVELOPMENT ACTION GRANT
BUDGET

Street	$7,933,838
Sewers	4,516,773
Fire Station	713,389
Relocation	136,000
Administration	160,000
Total	$13,460,000

TABLE 9

B.P.U. REVENUES/COSTS ASSOCIATED WITH
PROVIDING UTILITY SERVICE TO GENERAL MOTORS

		1984[47]	TEN YEAR TOTAL, 1983-1992
A.	REVENUES		
	1. Water Use[48]	$257,000	$2,441,500
	2. Electricity Use[49]	5,112,720	48,570,840
	3. G.M. Electricity[50] Reimbursement	233,250	2,332,500
	*TOTAL REVENUES	$5,602,970	$53,367,340
B.	COSTS		
	1. Electricity Installation[52]	$395,597	$3,955,970
	2. Water Installation[51]	0	0
	3. Electricity Operation[53]	3,024,000	28,728,000
	4. Water Operation[54]	89,000	845,500
	*TOTAL COSTS	$3,508,597	$33,551,970
C.	NET GAIN (LOSS)	$2,094,373	$19,815,370

FOOTNOTES

[1] It is assumed that the assessed valuation of real and personal property of the Fairfax plant will remain the same through 1984. It is also assumed that the 1981 tax rates displayed for all jurisdictions will remain constant.

[2] It is assumed that the Fairfax plant will stop production in July, 1983, remaining vacant thereafter. Under these conditions, the assessed value of personal property would go to $0 (effective Janaury, 1984). It is also estimated that the assessed valuation of real property improvements would be reduced by 40% (effective January, 1985), although actual change would be based on market conditions.

[3] Revenue loss=Columns 1 (Existing Revenue)-Column 2 (Estimated 1986 Revenue).

[4] Annual impact on the tax rate is computed using the following formula:

$$\text{Impact} = \frac{\text{Current Tax Revenues}}{\text{Total Assessed Valuation, less GM loss}} \times 100 - \text{Current tax rate}$$

[5] Total tax revenue loss for 1983 through 1992 is computed in the following way:

Tax loss, 1983-1984:	$ 0
Tax loss, 1985:	1,153,178
Tax loss, 1986-1992:	1,342,559 x 7 = $9,397,913
Total tax loss, 1983-1992:	$10,551,091

FOOTNOTES

[6]The gas franchise tax ($37,350/year) is based on 5% of estimated $747,000 in total gas bills in 1980. The gas franchise tax payments to the City in 1981, however, are based on gas bills for the final six months of 1980 and the first six months of 1981.

[7]The 1981 and 1982 telephone franchise tax payments to the City ($230) are based on a per station charge. Effective 1983, however, the telephone franchise tax will amount to 5% of the previous year's total billings.

[8]The BPU payments to the City in lieu of taxes in 1981 are based on 4% of an estimated $2,568,000 in water/electricity use in 1980.

[9]Sewer service charges are based on figures provided by the City's Water Pollution Control Department.

[10]City license fees are now $600/year for large manufacturers like GM. This $600 figure is assumed throughout the time period portrayed in this table, although license fees are expected to increase in the near future.

[11]These payments from the State are based in part on the assessed value of property and population within the City.

[12]The total revenue loss is computed in the following way:

Total revenue loss, 1983:	$ 50,300
Total revenue loss, 1984:	153,830
Total revenue loss, 1985:	209,540
Total revenue loss, 1986-1992:	273,233 X 7 = $1,912,631
Total revenue loss, 1983-1992:	$2,326,301

[13]The sewer service charge is the only operating revenue source in Table 2 that does not go into the City's general fund, but rather the Sewer System Fund. This charge thus is not used in computing an annual impact on the City's tax rate.

[14]The average annual impact on the City's tax rate (based on losses in operating revenue incurred from the Fairfax plant) is calculated as follows:

$$\text{Average Annual Tax Rate Impact} = \frac{\text{(Average Annual Operating Revenue Loss)}}{\text{(Total City Assessed Valuation)}} \times 100$$

FOOTNOTES

[16]The 5,300 Fairfax G.M. employment is based on G.M.'s average employment during full production. Present employment is at approximately 2,600.

[17]In this table, it is estimated that 25 percent of G.M. employees reside in Wyandotte County. This estimate is based on two data sources. First, G.M. records (2/18/80) indicate that 26.7 percent of their employees have Wyandotte County zipcodes. A subsequent survey (January, 1981) prepared by the City's Information and Research division revealed that 24.1 percent employees reside in Wyandotte County.

[18]Wyandotte County employment includes individuals employed in Wyandotte County, regardless of residence. The 85,628 reflects March, 1979 employment, and was obtained from Gib Dunn of the Kansas Department of Human Resource, Employment Services Division, Kansas City, Kansas.

[19]Wyandotte County employed civilian labor force includes employed individuals residing in Wyandotte County regardless of place of work. This figure was obtained from the Department of Human Resources, Topeka, Kansas and is based on the average 1980 monthly totals.

[20]The Wyandotte County household total was derived by dividing the 1980 Wyandotte County preliminary population total (171,121) by the July, 1980 local review average household size estimate of 2.68 for Wyandotte County.

FOOTNOTES

[21]This total is based on an employment multiplier of 1.914401 for the motor vehicle manufacturing industry developed by the Kansas City, Missouri City Development Department.

[22]This total was derived by multiplying GM employees-Wyandotte County residents 1,325 by $10.68 (salary per hour) times 1,800 (average annual hours per employee).

Source: General Motors Corporation in Draft E.I.S.-General Motors Plant Relocation Kansas City, Kansas.

[23]The secondary income total was derived by multiplying the income multiplier for motor vehicle manufacturing of 2.1728808, developed by the Kansas City, Missouri City Development Department times the direct income estimate of the Fairfax plant Wyandotte County employees.

[24]Personal consumption expenditures were estimated to be 60.7 percent of total income. This percentage was taken from Bureau of Labor Statistics, Urban Family Income, Autumn 1979, intermediate family income, Kansas City Metropolitan area. Housing shelter costs are not included as a consumption expenditure.

It is also assumed that all of the personal consumption expenditures occur in Wyandotte County.

[25]Estimated sales tax revenue for Wyandotte County was computed as 1 percent of personal consumption expenditures. The percent figure includes a ½ cent County sales tax, which the City receives approximately 81.1 percent and a ½ cent Kansas City, Kansas sales tax.

[26]The City share was computed as follows: $49,057,124 (.811)(.005)+$49,057,124(.0(
$444,212

[27]The annual impact to the City tax rate was computed as follows:

$$\text{Tax Increase} = \frac{\text{Loss in Revenue}}{\text{KCK Assessed Valuation/100}}$$

or

$$\text{Tax Increase} = \frac{444,212}{339,016,253/100} = .131$$

FOOTNOTES

[28] In all likelihood, an Industrial Revenue Bond will be issued to fund construction of the new plant. As a result, GM will be liable for personal property taxes on its inventory. It is assumed that the assessed value of personal property inventory at the new plant in 1983 (assuming a full year of operations) will be about $3,349,000.00. It is assumed that USD 204 will receive 90% of this personal property tax, and that USD 203 will receive 10%.

[29] The railroad tax revenues are estimated using a calculation of the $20,000,000 investment and its effect on the entire Missouri-Pacific total investment for their national network. Dividing the net investment for Mo-Pac of $946,006,491 by a total system cost of $1,750,000,000, then multiplying the result by $20,000,000, produces a net value of $10,811,502 for the investment in Mo-Pac's entire system. This is multiplied by 12.9% Kansas proportion of the national systems value, yielding $1,394,680. This figure is then assessed at 30% value ($418,400) and taxed at the appropriate rate. The figures used in this table assume (1) that the railroad spur will be 80% in Kansas City, Kansas and 20% in Prairie Township; and (2) that railroad taxes are split 90/10 between USD 203 and USD 204, respectively.

[30] The positive annual impact on each jurisdiction's tax rate (based on increases in revenue resulting from the new GM plant) is calculated as follows:

$$\text{Average Annual Tax Rate Impact} = \frac{\text{Average Annual Operating Revenue Gain}}{\text{Total Assessed Valuation}} \times 100$$

FOOTNOTES

[31]The gas franchise tax ($62,000/year) at the new plant is based on a full year's estimated $2,300,000 in consumption, provided by the Gas Service Company.

[32]The telephone franchise tax ($8,700/year) at the new plant is based on a 1980 estimate of $174,000 in billings at the present facility, taxed at 5%.

[33]The B.P.U. payments in lieu of taxes are taxed on an estimated full year's revenue of $5,369,720 in water and electricity.

[34]The Water Pollution Control Department estimates that sewer service charge at the new plant will amount to $240,000, assuming a full year of operation.

[35]This figure assumes that $589,000 in general obligation bonds will be issued to cover the costs of street design ($400,000) and sewer construction ($189,000). Also assumed is a twenty-year term, 9% interest, and equal annual payments, beginning in 1983.

[36]The public transportation estimate assumes 4 round trips during both the morning and evening rush hours from downtown Kansas City, Kansas to the GM plant. Costs associated with the service would vary with different frequency levels, or alternate routing.

[37]To this date, GM, the Port Authority, and the City have not reached final agreement on the scheduling of administrative charge payments. These parties have agreed, however, that the total 20 year payment will exceed $50 million.

[38]Building permit fees ($435,000) are based on a calculation of $6 plus $3/$1,000 of estimated construction costs. The new GM building has an estimated cost of $125,000,000 and the railroad spur $20,000,000. It is assumed that these fees will be paid in 1981.

[39]The Water Pollution Department estimates that sewer connection fees will range between $100,000 and $153,000. $129,500 is used in this table because it represents the midpoint of this range.

[40A]This amount represents an average of excess operating and equipment costs for the new fire station. It is assumed that 80% ($828,000/year) of the $1,035,000 annual costs are directly attributable to GM between 1983 and 1987, declining to 10% (103,500) in 1988 and each subsequent year. This rationale reflects assumptions that (1) GM represents about 10% of the land area to be serviced by the new station; (2) the proportion of fire service to GM will decline as additional industrial, residential, and commercial development occurs in the area; and (3) the City had plans to build a fire station in the area in the near future regardless of GM, because of population growth and projected I-435 impacts.

FOOTNOTES

40B This amount represents an average of excess operation and equipment costs attributable to the new plant for the Police Department. It is estimated that 50% ($112,000/year) of the $224,000 annual excess operating costs are directly the result of the new plant for each year between 1983 and 2002. This reflects an assumption that 50% of police patrols will be devoted to GM-related activity and the other 50% will service present and future residences, commercial, or industrial facilities anticipated from projected population growth and I-435 impacts.

41 In most cases, City revenues from the new plant are not fully realized until 1986. The twenty-year total displayed in Table 6 represents the sum of actual revenues between 1983 and 2002.

FOOTNOTES

[42]The G.M. plant at 100th and State is expected to employ 6,000 at full production. At the present plant, Wyandotte County residents account for 25 percent of the employees. (See footnote 16.) The 1,500 total was computed by taking 25 percent of the projected 6,000 employees.

[43]The income total was derived by multiplying 1,500 by $10.68 (Present salary per hour) by 1,800 (Average annual hours per employee). Also see footnote 22.

[44]The secondary income generated was computed by multiplying the 110th and State site income by 2.1728808, the income multiplier for motor vehicle manufacturing developed by the Kansas City, Missouri Development Department.

[45]The Kansas City, Kansas share was computed as follows:

$$\$55,536,367(.811)(.005)+\$55,536,367(.005) = \$502,882$$

[46]The annual impact to the City tax rate was computed as follows:

$$\text{Tax Savings} = \frac{\text{Gain in Revenue}}{\text{KCK Sept., 1980 Assessed Valuation/100}}$$

$$\text{Tax Savings} = \frac{502,882}{339,016,253/100} = \$.148$$

FOOTNOTES

47 1984 represents the first full year of operation at the new GM plant.

48 Water revenue at the new plant is estimated at $257,000, assuming a full year of operation and present utility rates. These figures were provided by the B.P.U.

49 Electricity revenue at the new plant is estimated at $5,112,720, assuming a full year of operation and present utility rates. These figures were provided by the B.P.U.

50 General Motors will reimburse the B.P.U. for several additional electrical facilities it has requested beyond what is considered "normal" by the B.P.U. This reimbursement will amount to $233,250 per year over a twenty-year period.

51 General Motors will reimburse the B.P.U. for the entire cost of water installation, estimated at $22,500.

52 It is assumed that electricity installments will be financed by a bond issue with a twenty-year term, 9% interest, and equal annual payments. This amounts to $395,597 per year for twenty years.

53 It is estimated that the costs of providing electricity to the new facility will be $3,024,000 annually (1.8¢ x 168,000,000 KWH).

54 The B.P.U. estimates that the cost of providing water at the new plant will be $89,000 annually.

APPENDIX F

STATE HISTORIC PRESERVATION OFFICER'S LETTER

KANSAS STATE HISTORICAL SOCIETY
120 West Tenth • Topeka, Kansas 66612 • 913/296-3251

April 3, 1981

Dean Katerndahl
Director
Economic Development Department
Municipal Office Building
Kansas City, Kansas 66101

Re: Draft Environmental Impact Statement--GM Relocation Project

Dear Mr. Katerndahl:

Staff review of the draft Environmental Impact Statement for the General Motors Relocation Project has been completed. This review indicated the project will not affect any property listed on the National Register of Historic Places, nor any historic or archeological site in the state inventory. This review indicates completion of the project would not be detrimental to the goals of historic preservation in Kansas.

Very truly yours,

Joseph W. Snell
State Historic Preservation Officer

Richard Pankratz
Historic Preservation Department

RP/maw